STEEL
The Weekly Magazine of Metalworking

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THIS WEEK IN METALWORKING

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Next Week ... **High Speed Quenching Oils Increase Surface Hardness ... "Erector Set" Construction Used in Test Laboratory ... Duplex Setup Solders Type to Typewriter Bars ... Vacuum Melting Titanium and Zirconium**

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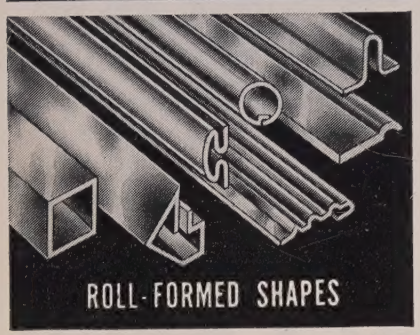

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Behind the Scenes...

Read Greek?

Coming down to the office the other morning via the Rapid Transit, we sat next to a chap who we thought was a typical businessman—gray suit, homberg, brief case and all. We had a start, though, when we glanced over to see what he was reading. Homer's Iliad, in the original Greek.

Research

We were interested in comments by Carl E. Hoover of Perfect Circle Corp. made a while back at the meeting of the American Society for Quality Control. He points out that quality control is one of industry's most potent tools, but that it won't mean a thing if the quality control engineer can't put it across with people. By indirection, he says that quality control engineers should do a little statistical research on what makes people tick as well as what makes assembly lines run.

He evidently has done such research, for he says that these are the peculiarities of three out of four of the folks with whom we come in contact: They worry a lot; their feelings are hurt easily; they are very deliberate in everything they do; they resent being ordered to do anything; they are urged to their greatest efforts by praise; they are suspicious of the motives of others; they are radical in religion and politics; they would rather struggle alone with a problem than ask for help; they would rather work alone than with others; they prefer reading to athletics or any "big muscle" activity; they day dream a lot; they are poor losers; they prefer meticulous detailed work; they are moody; and very conscientious. The habit and attitude patterns of the fourth person you meet, says Mr. Hoover, are the opposite of those just given.

Do you agree?

Mr. X. Inconel

We have just seen a questionnaire addressed to Mr. X. Inconel, c/o Editor, STEEL. The query came from A. N. Marquis Co., publisher of *Who's Who in America,* and is designed to gather names and specialties for a companion volume, *Who Knows—and What.* One Marquis technique is to find the technical experts by looking up authors in business magazines, including STEEL. A shrewd technique. But Mr. X. Inconel really threw us.

After considerable debate as to whether the X stood for Xavier or Xenephon, we finally discovered it stood for neither. We have tied the illusive X. Inconel down. Designated Inconel X is an alloy developed by International Nickel Co. and featured in headline and story in STEEL some time back.

Power of the Press

In the inevitable spurts of pessimism that come to us all, the editors upstairs sometimes wonder about how empty or full the term "power of the press" is.

Machine Tool Editor Guy Hubbard, in his "Seen and Heard in the Machinery Field" department of May 14, mentioned in passing the clear answer by Barber-Colman Co. to the question: What is a machine tool? That comment elicited hundreds of inquiries for the answer, contained in Barber-Colman's house organ, *Hobbing Notes,* including one from President Truman's Materials Policy Commission.

Puzzle Corner

The May 21 problem about the pennies, which we answered last week when we went to press too soon to carry names of those who had solved it was correctly figured out by Carl J. Kugler of Philadelphia, H. L. Ludwig of United States Steel Export Co. and J. C. Severn of Toledo Pressed Steel Co. Art had 20 pennies, Bob 55, Charlie 127 and Dave 29.

First in with the correct answer to the May 28 problem were J. F. Findlay of El Potosi Mining Co. and Helen Fyfe of Central Iron & Steel Co. The second quarter makes one complete revolution.

A tank having inside dimensions of 24 inches by 24 inches deep is filled with water to a depth of 6.5 inches. A copper bowl of uniform thickness, an exact hemisphere with an outside diameter of 20 inches, is floated in the tank. When the bowl is in equilibrium, the bottom of the bowl is 0.227 inches from the bottom of the tank. What is the thickness of the copper of the bowl? The specific gravity of copper is 8.94.

Shrdlu

(Metalworking Outlook—Page 39)

STEEL

The Metalworking Outlook

June 11 1951

A Matter of Language

Will we have relief from the steel shortage soon, as some industry statements suggest? The answer depends on the meaning of "soon." If "soon" means by the fourth quarter of this year or the first of next, chances for marked easing in supplies are unlikely. If "soon" means about a year from now, prospects for relief from the scarcities are good. The fourth quarter of 1951 could be the tightest period all year.

The Question of Inventories

Steel inventories are unusually high in some metalworking plants, but those are still isolated cases. What's more, most of the big inventories are badly unbalanced. The suspicion grows that some companies heavily in defense work, particularly for ordnance items, have more steel than they need at the moment. Depleted steel inventories are one of the reasons why General Motors Corp. will have a temporary shutdown in passenger car manufacturing and assembly plants July 28 through Aug. 6.

Gray Market Prospects

Only 2 per cent of the gray market steel currently being offered originates from domestic mills. That estimate comes from brokers of premium priced material who say that some 80 per cent of the gray market steel in the 1948 shortage stemmed from domestic sources. In 1948 and now, scarcely any of the gray market steel originating from domestic mills was sold direct by the mill at gray market prices. Most of it went at regular quotations to consumers presumed legitimate who resold it via the back door. The marked drop in gray market steel now available is caused by more efficient policing by steel companies. Most of the premium priced material now on the market is imported (p. 57).

Compromise on Wages, Prices

Wage stabilization and price control people may reach this working compromise on the wage-price question: Wage increases will be granted fairly freely—but only if they involve slight or no price increases. The catch is that many labor contracts are being negotiated now on the basis that they will be granted only if OPS approves a price hike. Westinghouse is working it that way (p. 51). How long will the patchwork compromise last? Consensus in industry: About two or three months.

Shakeup in Washington?

Watch for a big shakeup in the Washington defense organization soon. Defense Production Administration and National Production Authority overlap in functions and authority. DPA may be abolished entirely and NPA strengthened. Such a move would relieve Defense

roduction-Engineering News—p. 75 The Market Outlook—p. 143

Boss Charles E. Wilson of the task of appointing a permanent DPA administrator to fill the vacancy made when W. H. Harrison resigned to return as president of AT&T. Acting Administrator Edwin T. Gibson is anxious to return as vice president of General Foods. If DPA is abolished, NPA Administrator Manly Fleischmann will become an even more important man in the defense setup than he is now.

From the Top Down

Control orders from Washington now come from the top down, not the bottom up as was the case in World War II. Then, many of the orders were actually written by personnel in middle and lower echelons and merely passed on by the top men. Now the top men do the writing as middle and lower echelon people are left to wrangle over who has jurisdiction over what, how to get more office space and where to find a secretary.

Second Look at Fast Amortization

Expect legislative proposals to revise the procedure on accelerated writeoffs of new defense facilities. Sen. Burnet R. Maybank, chairman of the Senate Banking Committee, wants an amendment to the present law requiring the DPA to dispose of all pending applications for fast amortization before any company can be given a second certificate. He would also ban fast writeoffs of facilities started before July 1, 1950.

Scrap Drives: Little Help Yet

Drives to increase the flow of iron and steel scrap haven't helped a great deal yet, although it is still early. The steel industry is now down to 21-day inventories, on the average, compared with 60-day stocks normally. That's dangerously low in this season of the year when good weather usually speeds the movement of scrap.

Straws in the Wind

OPS is watching the Gimbel-Macy price war, but it has little hope that the battle will spread beyond limited retail levels . . . Many machinery makers are no longer taking any new orders; reasons: Price situation is still foggy, and they have too-large backlogs anyway . . . Degrees in quality control engineering will eventually be offered by many universities; some 30 now have quality engineering courses, usually as part of the mechanical engineering curriculum.

Here and There in Industry

For the want of a gage, defense production may be lost in coming months (p. 47) . . . The U.S. will defer some expansion applications for fast tax writeoffs filed after June 15 (p. 47) . . . A Giddings & Lewis machine tool is designed to make integral-rib aircraft skin stronger, faster (p. 49) . . . Nylon gears are practical in some applications, American Gear Manufacturers Association was told (p. 50) . . . The defense loan program is running into snags (p. 52) . . . Latest phone and office directory of DPA and NPA personnel begins on p. 58.

Cross-Fertilization of Ideas

Incidence of two global wars within a generation has caused leaders in every principal industrial nation in the world to revise their ideas about sources of essential raw materials. Particularly during the past decade there has been an intensive search for new reserves of important minerals situated in places that are as advantageous as possible from geographic, economic and military standpoints.

Now that the major threat to peace comes chiefly from the differences in viewpoints of the Soviets and of the free nations, the pursuit of minerals resolves itself into a race between Russia and her satellites on one side and the United States and her allies on the other. To date most of the emphasis on this competition has been placed upon the possession of physical resources. Almost every day one sees charts showing how much iron ore, copper, aluminum, manganese, etc. is controlled by the Soviet bloc in relation to that controlled by the Western nations.

These comparisons are important, but they leave out of consideration a factor of vital significance. That factor is the availability of high grade scientific "know how," which is so essential to the proper utilization of physical resources. Nobody knows exactly just how the scientific brainpower of the world is divided, but the few private investigations that have been made on this subject indicate that for every top flight scientist uprooted during the late war who has entered the Communist sphere of influence there are six to ten more who have gravitated into free territory. This migration, coupled with the abundance of scientific personnel in the United States, Britain and other western nations gives the free world a tremendous advantage over the slave world.

Alert to the possibility of enhancing this advantage, the American Society of Metals has asked Dr. Zay Jeffries to organize a World Metallurgical Congress to be held in Detroit, Oct. 15-19. It is hoped the presence of 200 to 300 top metallurgists from all free sections of the world will lead to a cross-fertilization of their ideas. It is a timely and highly meritorious objective.

E. L. Shaner

EDITOR-IN-CHIEF

3 WAVES IN 5 YEARS: Chester H. Lang, vice president of General Electric Co., foresees a series of three waves of peak demand and productivity during the next five years. The first is a continuance of the present demand for producers' equipment, which he believes will reach its peak this year, with production holding to high levels until 1953 when it will taper off. The second wave will be in the output of tanks, planes and other military durables. It

will reach its high point in 1953. The third wave will be in consumer durables and its peak is predicted for 1954.

This forecast is based upon the assumption that an allout war will be averted. The prospect of staggered waves of capacity operations will be welcomed by producers and manufacturers who cater to all three types of demands. To some other firms it will necessitate rather difficult adjustments. —p. 59

* * *

STEEL FOR EUROPE: In their zeal to procure steel which is difficult to obtain from domestic sources, American consumers have been purchasing from 30,000 to 40,000 tons monthly from foreign steelmakers during the first and second quarters of this year. Most of it comes into East Coast ports and about 10,000 tons monthly arrives at Gulf Coast ports.

This steel is bought in two ways—from American brokers or direct from European mills or their representatives. If the buyer deals with an American broker he saves a lot of headaches in finance and shipping and he gets a guarantee on quality. If he buys from a European mill, his chances are better if he has coal, machinery or other bartering material to offer. Also he needs a reliable inspection service at the mill shipping point.

Experienced importers warn buyers to be cautious when ordering plates one inch or heavier; they may turn out to be salvage material. —p. 57

* * *

CONSERVING MACHINES: Machine Tool Editor Guy Hubbard thinks too many scarce standard machine tools are tied up on routine production work which could be done much faster and with fewer and less skilled operators on simpler machines. The "simple" machines he has in mind are ingenious assemblies of standard self-driven and self-fed units which are manufactured on a semi-mass production basis. A typical example is a machine which drills 16 holes simultaneously in aluminum gas tanks. It consists of 16 self-powered, self-feeding drill units mounted on a structural steel frame. On this improvised machine, one man can do what four men could do on conventional drilling machines.

Machines of this type look pretty crude but they have served American industry with distinction in every period of emergency. Right now, don't tie up a valuable standard machine tool on a simple job. Free it for more important work by transferring the job to a simple improvised unit. —p. 78

* * *

WHAT PRICE FREEDOM? Addressing the Boys' Club of America on May 11, Bernard M. Baruch stated clearly today's major issue. He said the Soviet regime assumes that people are unfit to govern themselves but must obey the dictates of a chosen few who claim they know all the answers. Our country, he says, stands for faith in man's ability to govern himself through representatives of his own choosing.

Our test, he maintains, is one of government. "Either we succeed in governing ourselves or, if we fail, we invite others to shackle us in ruthless subjection. If this nation is overwhelmed, it will be because we put petty comforts ahead of disciplines required to protect our liberties; it will be because we failed to discipline the various pressure groups in the national interest."

* * *

LEEWAY FOR AUTOS: National Production Authority has devised a novel way of indicating to automobile manufacturers how much material they can use for civilian cars after July 1. It tentatively grants motordom a limit of 1.2 million cars for the third quarter and assigns to automakers these percentages of this total: General Motors 41.35, Chrysler 21.65, Ford 21.35, Studebaker 4.25, Nash 3.3, Hudson 2.95, Packard 2.15, Kaiser-Frazer 1.55, Willys-Overland 1, Crosley 0.35 and Checker Cab 0.1.

This assignment doesn't limit any builder to a definite number of cars. Instead, it provides a method by which each company determines how much steel, copper and aluminum it is permitted to use. Each builder can utilize his quota in any way he chooses.

These provisions are in NPA's regulation M-68. Its flexibility in some respects is offset by doubts about Section 8. There are other moot questions about M-68, but in the main it affords automobile builders welcome elbow room in which to operate. —p. 61

Bottlenecks in Rearmament Are Possible As . . .

Gage Shortage Threatens Output

The scarcity is especially alarming in defense production which often requires different gaging than in normal manufacturing operations

FOR THE WANT of a gage, vital defense production may be lost in coming months. A shortage in inspecting and manufacturing gages is developing that's reminiscent of World War II when for a time a scarcity in those important but oft-forgotten instruments was a near-tragic bottleneck.

Today, Army Ordnance in its seven manufacturing arsenals alone needs gages at an estimated rate of $52 million a year. The entire gage manufacturing industry probably isn't producing that much, and it must also supply substantial needs of the Navy, the Air Force and industry. No firm figures exist by which the total annual gage output rate may be projected, but estimates range from $35 million to $50 million a year. The 15 major companies have a $26-million productive capacity per year.

Unbalanced — Nobody knows for certain what total demand for gages now is, but one executive guesses about $70 million worth a year currently for the armed services alone—and rising rapidly. That's $52 million for Army manufacturing and inspection, $6 million for Navy manufacturing and inspection, $12 million for Air Force inspection. Industrial demand is at least as much as for all the armed services put together. Total requirements, of course, are far above present capacity.

Despite that situation, only a handful of gage manufacturers are expanding. Why? Because many had the props knocked from under them after World War II. In 1945 there were some 300 gage making firms. Today 15 account for the bulk of the volume. Most of the 300 dropped gage manufacture after the war and sold or scrapped their equipment because a normal civilian market was not enough to support them. Even most of the companies that stayed in gage manufacture had to adopt or expand other lines. Many also make machine tools.

Reluctant — So, established gage manufacturers are reluctant to expand without government assurances that they will be taken care of in case the artificial defense demand evaporates. No assurances have thus far been given. They still recall how the 1939 productive capacity of $5 million annually was boosted to $150 million by 1945, then allowed to drop with a sickening thud.

Nor is capacity the only factor limiting gage manufacture for defense purposes. Gages required by the Armed Services are different than those needed by general manufacturing firms. The industry wants assurances that the Armed Service demand for the different types will be sustained enough to justify the expensive retooling to produce them. In many cases such assurances have not been forthcoming.

Partial Solution—Gage makers say they can boost production somewhat even without capacity expansion if they can get more manpower, more materials and greater standardization. Manpower is the most serious problem with the majority because high skill is required. Although gage makers have received priority assistance, materials are still hard to get, particularly tool and alloy steels. Standardization is a slow process that offers faint hope for quick production increases. Some progress has been made in recent years. The 111 different gages once needed by producers of oil country goods have been reduced to nine. Most of the gages made today were made in 1939, but some like air and electronic gages have been greatly modified and improved and new uses found.

Gages for inspection are the only practical means for quality control, and without them many types of ordnance and mass-produced items cannot be manufactured. In some cases it is possible to manufacture without gages, but in every case production is hampered without the instruments.

Brakes on Expansion

The U.S. will defer some expansion applications filed after June 15

APPLICATIONS for certificates of necessity for certain types of industrial expansion filed after June 15—chiefly to boost the capacity to produce steel, aluminum and other basic materials—will not be considered, except in urgent cases, until after the present backlog has been processed.

Defense Production Administration has delegated to National Production Authority the job of determining when the basic materials applications are "urgent." Applications for expansion of basic capacity will still be received as usual.

Paperwork Ahead—As of May 25, 9153 applications had been referred by DPA to delegate agencies. Of that number, 1570 had been approved, for a total proposed investment of $5,992,007,000 in expansion of industrial facilities needed for defense.

Some 592 applications had been denied and 7081 were still pending review by delegate agencies which, besides NPA, include Department of the Interior for petroleum and gas, ores and minerals, electric power, and solid fuels; the Department of Agriculture for facilities to process food and other farm products; and Defense Transport Administration for transportation facilities.

The June 15 date applies only to applications to be reviewed by NPA. Those referred to other delegate agencies are not affected by the action.

But the Petroleum Administration for Defense in the Interior Department several weeks ago discontinued recommending approval of certificates for basic expansion in petroleum refining facilities until after its backlog on hand as of Apr. 30 had been processed.

Small Projects Lead—Of the total certificates so far granted, about one third are for projects costing $500,000 or less. Basic material certificates thus far approved account for nearly three-fourths of all certificates granted.

The certificates authorize the holders to deduct from taxable income from 40 to 100 per cent of the cost of the facilities during the next five-year period. The normal period for amortization of facilities allowed by the Bureau of Internal Revenue for tax purposes is 20 to 25 years.

Judson Steel Expands

Judson Steel Corp., Emeryville, Calif., on the San Francisco bay, has been granted a certificate of necessity for a $4.6 million expansion.

The expansion calls for a major addition to Judson's steel rolling facilities. The company is a producer of steel reinforcing bars and merchant bars, billets and light structural shapes. It has three open hearths.

The National Production Authority has certified 65 per cent of the total cost for write-off without tax penalties within the next five years under terms of the Defense Production Act.

Steep Rock Ore Output Rises

By the end of May, shipments of high grade iron ore from Steep Rock Iron Mines Ltd. had reached 209,305 tons for the 1951 season, as compared with 176,270 tons for the same period a year ago.

Steep Rock sent a total of 1,216,614 tons down the Great Lakes in 1950 from its Errington open pit mine on the Steep Rock range in western Ontario, Canada. Total 1951 tonnage from that mine is expected to exceed the 1950 figure.

All of Steep Rock's current production is from the Errington open pit, but the company is now preparing two more mines, the Errington underground and the Hogarth open pit, for early production and has several others projected for future development. In addition, Inland Steel Co. is working on a separate area of the Steep Rock range, under a lease-royalty arrangement. A group headed by Pickands, Mather & Co., and including Bethlehem Steel Co., Interlake Iron Corp., Steel Co. of Canada and Youngstown Sheet & Tube Co., have entered into a similar agreement with the Steep Rock company for the opening up of another separate area.

New Sheet and Strip Mill?

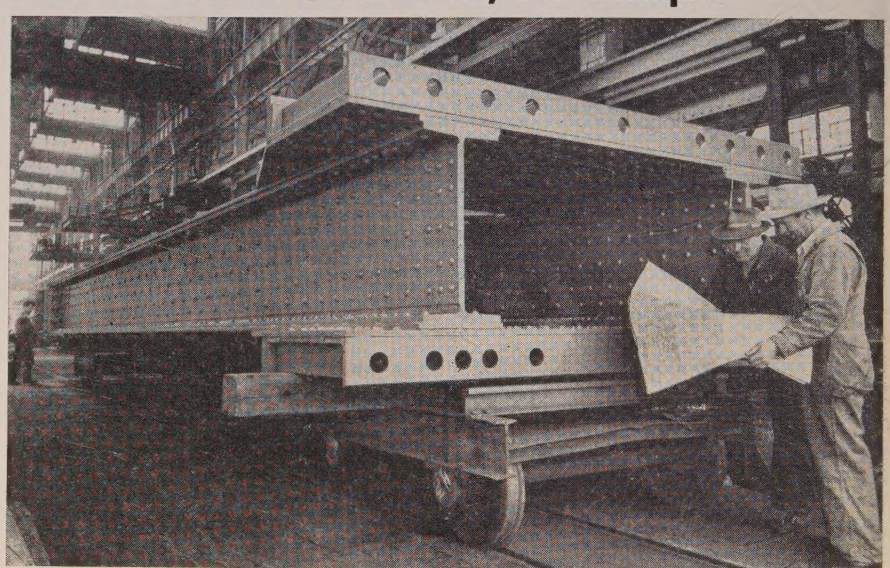
A sheet and strip mill costing $109,600,000 will be built in Tonawanda, N. Y., near Buffalo, by Colorado Fuel & Iron Corp., if demand warrants it.

The company has filed an application with the Defense Production Administration, Washington, for a certificate of necessity and fast tax write-off privilege.

The amount of money involved would indicate that primary steelmaking and related facilities would be included.

C.F. & I.'s Wickwire Spencer Steel Division now has two blast furnaces, four open hearths and a wire mill at Tonawanda. Capacity of the blast furnaces is 390,000 net tons of pig iron annually. The open hearth capacity totals 240,000 net tons of steel annually.

It Takes Steel To Make Steel; For Example—



STEEL EXPANSION FOR 1951-1952 WILL TAKE ABOUT 10 MILLION TONS

. . . one of six steel columns for Kaiser Steel's open-hearth addition

WHERE is all the steel going? Much of it is going into the steel industry. The fact is amply illustrated by the accompanying photograph. In it is one of six box-type steel columns used for Kaiser Steel Corp.'s open-hearth addition at its Fontana, Calif., plant. The columns were fabricated by Bethlehem Pacific Coast Steel Corp. Weight: Over 45 tons.

Expansion in the steel industry for this year and next will chew up about 10 million tons of steel. That much will be needed for ore mines, vessels, coal mines, coke ovens, blast furnaces, steelmaking furnaces, rolling mills, railroads, dock, pipelines, ferroalloy plants and other essentials. Kaiser Steel, for one, is taking a large bite of steel for its new facilities. Under construction at Fontana as the major part of the company's $24.5-million expansion program is an electrolytic and hot-dip tin plate mill.

Deliveries of the new mill equipment are expected to start this fall; operation is expected to start early next year.

Over the Peak—Already Kaiser's eighth open hearth has begun operations. It will raise rated capacity to 1,380,000 tons of ingots annually. That potential is 15 per cent over previous annual capacity of 1.2 million tons. It is an increase of more than 100 per cent over the amount of steel produced in 1944, peak war year.

Other facilities at Fontana at or near completion are: Two additional soaking pits, facilities for stripping ingot molds, handling capacity in the blooming mill.

Machining Integral Ribs

New machine tool is designed to make aircraft structures stronger, faster

LIGHTER, STRONGER aircraft, manufactured in less time, may be the result of a new machine tool made by Giddings & Lewis Machine Tool Co. and said to be the first capable of turning out self-reinforced airplane structures.

Aimed at cutting down weight and better adapting aircraft to the strain of near-sonic speeds, the device will be first used by Lockheed Aircraft Corp. in manufacture of F-94 jet fighters.

A Year's Work — Details were worked out by Giddings & Lewis in co-operation with General Electric Co. and Lockheed, using basic Lockheed specifications. Order for the machine was placed last July and all design and engineering have been done since that time at a cost of nearly $500,000. Work is being completed at the Giddings & Lewis plant at Fond du Lac, Wis.

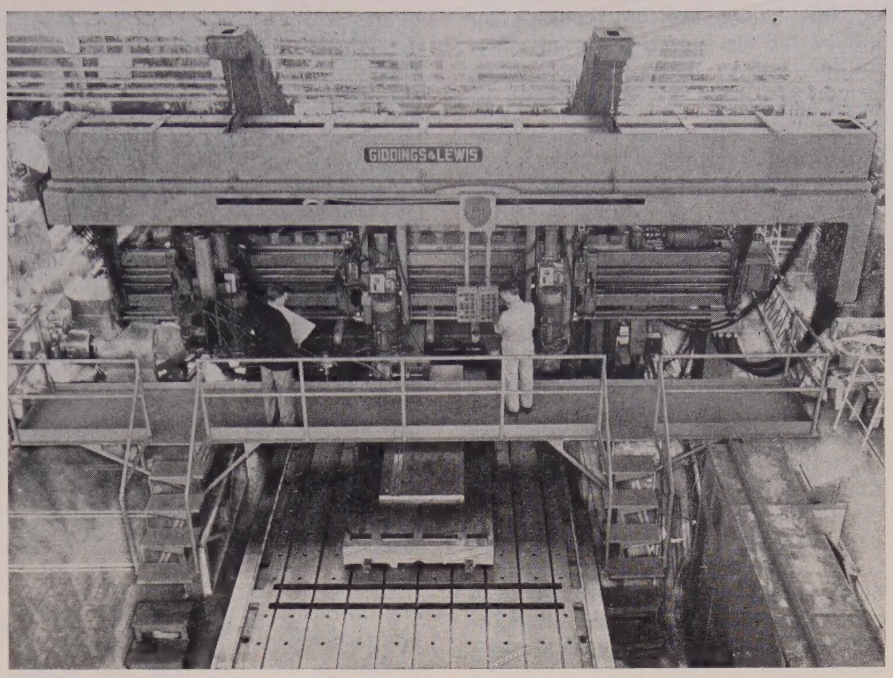
The machine mills integral-rib skin panels from solid or rough-forged two-inch aluminum alloy plate, permitting design of thinner wings and sharper fuselages. Resulting self-reinforced surfaces replace the forest of braces, struts, ribs and girders welded into the structure in normal manufacture and will make the F-94 stronger, faster and capable of carrying more fire power and fuel loads, say Lockheed engineers.

Increased Payloads—Present estimates by Lockheed show the net saving of structural weight and consequent increased payload resulting from this application in a civilian Constellation would be about 800 pounds.

Weight of the new machine tool is 200 tons. It is 80 feet long, 18 feet high and 30 feet wide. Chips, removed by an integral conveyor system, are produced at the rate of a barrel a minute. A novel feature is elimination of trailing hoses and electric lines by use of a feed reel in a horizontal box-type housing at the machine's top.

Electronics by GE—General Electric motors and controls are used throughout. Operating with two feed motions, the feed range extends from three-quarters of an inch to 150 inches. Speed and steering controls, which guide the machine's cutting angle, are combined for ease of operation. Electronic tracer control guides longitudinal and lateral cutting motions simultaneously.

Site for the operation will be Lockheed's new "Hall of Giants" fabricating building at Burbank, Calif., where Lockheed engineers point out it will also reduce the number of parts needed and cut down assembly and handling time.



INTEGRAL-RIB AIRCRAFT SKIN PANELS ON A NEW MACHINE TOOL
. . . Giddings & Lewis, General Electric, Lockheed co-operated

Expansions in Expansions

Both aircraft builders and manufacturers of electrical and electronic equipment for the defense effort are asking substantial amounts for new plants from the Defense Production Administration. Requests for funds for guided missile plants are smaller but indicate a definite growth in this new branch of the aviation industry.

Washington reports indicate that aircraft companies have filed 564 requests for new facilities costing $598 million and that so far $169 million worth has been approved. Electronic and electrical firms have filed 379 requests for $253 million but only about $55 million has been granted

TIE ROD AIRLIFT: When Aluminum Co. of America found it needed a 10-ton tie rod in a hurry for its Vernon Works in Los Angeles it called on Slick Airways to fly the 32½-foot steel column all the way from Philadelphia, where it was fabricated and machined by the Midvale Co. Speedy transit will allow Vernon Works to put an extrusion press for aircraft parts to work ten days before schedule

so far. There are 29 requests for guided missile facilities costing $23.4 million, but so far only $6.3 million worth has been given approval by DPA.

Army Orders Jet Helicopter

A collapsible, light-weight, jet-powered helicopter, will be built for the Army by the American Helicopter Co., Manhattan Beach, Calif., reports the Department of Defense.

As yet unnamed, the company's design was among those selected for further development from proposals submitted by eight aircraft companies in design competition conducted by the Air Force for the Army. The new single-place helicopter, first such jet-powered craft used by the Army, can be collapsed by two men and loaded aboard a jeep. It is assembled with ordinary tools and operates on regular fuel used in Army vehicles.

Pilotless Missiles Developed

A complex but accurate electronic control system for guiding pilotless missiles to high-flying enemy aircraft and blasting them out of the skies has been developed by Bell Telephone Laboratories, research and development unit of the Bell System.

Enemy aircraft are detected and tracked by Bell's Western Electric radar which feeds a computer informaton concerning the plane's altitude, speed and course. Launching and flight of the missiles are controlled from a master panel.

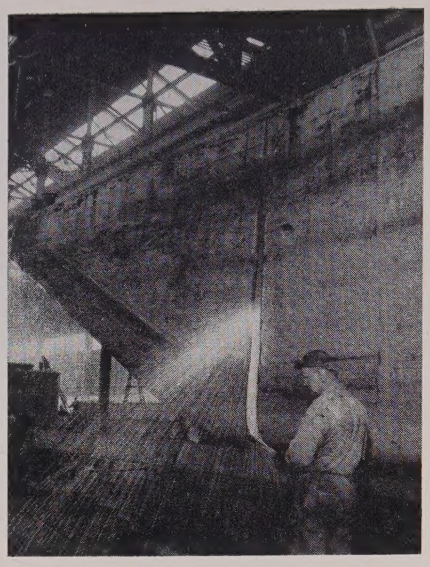
Bell Laboratories developed the control system under a contract between the Western Electric Co. and the Army Ordnance Corp. Aerodynamics of the project and design of the missile itself are being handled by Douglas Aircraft Co. Inc. as a subcontractor.

ASM Names Officers, Trustees

Nominating committee of the American Society for Metals named the following men to serve as officers during the 1951-52 term:

President, Dr. John Chipman, head of the department of metallurgy at Massachusetts Institute of Technology; vice president, Ralph L. Wilson, director of metallurgy, Timken Steel & Tube Division, Timken Roller Bearing Co.; and treasurer, Ralph L. Dowdell, head of the department of metallurgy at the University of Minnesota.

Trustees named are J. B. Johnson, chief of materials division, Wright-Patterson Air Force Base, Dayton, O., and George A. Roberts, chief metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa.



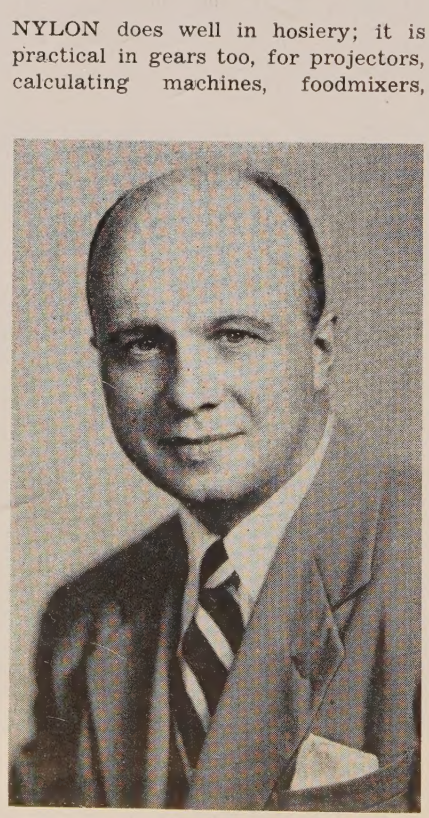
TWO-FOR-ONE: A new look is given old barges at U. S. Steel's American Bridge plant on the Ohio river at Ambridge, Pa. Thirteen old barges are having their curved end sections burned off and box-like new ones welded on. The 40-ton "discards" will then be used as bow sections on 13 additional barges. Butt ends of two barges are connected in a tow

Materials for Gears

Nylon, powdered metals get increased attention as gear materials at GAMA meeting

NYLON does well in hosiery; it is practical in gears too, for projectors, calculating machines, foodmixers, electric fans, washing machines and other devices.

So said Fred R. Zumstein, Fellows Gear Shaper Co., who spoke at the 35th annual meeting of American Manufacturers Association June 3-6 at Hot Springs, Va. He and others at the convention talked about materials for gears and the related machinery details that will be affected by the materials. Mr. Zumstein dealt with molded plastics and went into details as to molding machines and die uses.



G. H. McBRIDE
. . . president, Gear Manufacturers

Powdered Metals — D. W. Lynch, T. J. Snodgrass and T. T. Woodson, General Electric Co., discussed GE's growing use of powdered metal gears, racks, segments and cams. Mr. Lynch, who was spokesman for the three, says that powdered metallurgy is far from being the new technique that most people assume it to be. It dates back 5000 years to the early Egyptians. Unable to generate heat sufficient to smelt iron as is done today, they produced a sponge iron which they compacted into iron tools by vigorous hammering. Powdered metallurgy, as we know it today, is due to comparatively recent improvements in metal powders as bonding agents, improvements in presses and improvements in die design.

Mr. Lynch pointed out the importance of copper as a bonding medium in stepping up the tensile strength of powdered iron bars. Because dies are so expensive, powdered metals are usually confined to big production runs.

Awards — AGMA's Connell award went to Edward W. Miller, Fellows Gear president, who has been in the industry 53 years and was AGMA president in the difficult years, 1933-1934. The association also bade farewell to Newbold C. Goin, AGMA's full-time executive secretary, who will re-enter private industry.

New AGMA president is George H. McBride, sales manager of Westinghouse Electric Corp.'s Gearing Division. Other officers elected for 1951-52 are: Vice president, S. L. Cravshaw, assistant to the president, Western Gear Works; treasurer, Louis I. Bond, president and general manager, Christiana Machine Co., Charles Bond Co. subsidiary. Next AGMA meeting will be at the Edgewater Beach Hotel, Chicago, Oct. 1-3, 1951.

Norton Builds Grinder Plant

A $6 million expansion plan is under way at Norton Co., Worcester, Mass., to ease pressure from a two year grinding machine backlog.

Certificates of necessity have been granted by the Defense Production Administration.

Wages at Westinghouse

They'll go up 9 cents an hour if Washington approves. OPS O.K. is also required

ANOTHER headache for the Wage Stabilization Board: The Westinghouse-CIO agreement on a 9-cent pay hike.

If WSB approves—and that is the big "if"—bang goes another body blow to the wage-freeze policy which is already more than a little punchy. Nearly 50,000 Westinghouse Electric Corp. employees represented by the IUE-CIO in 22 plants throughout the country are involved in the agreement.

Over the Top—If the wage increase is approved, it will be retroactive to Apr. 16. It will bring the average hourly wage of workers up 9 cents to $1.84, an increase of 20 cents in less than a year. Adding incentive pay brings the average hourly rate to $1.93. Salaried employees represented by the CIO will receive an increase of $3.60 a week or $15.60 a month on the basis of a 40-hour week.

The agreement will be in effect until Oct. 1, 1952, subject to reopening of wage and salary negotiations between Feb. 1 and Apr. 30, 1952. It needs approval of both WSB and the Office of Price Stabilization. The latter o.k. is required because Westinghouse President Gwilym A. Price says "a new general pay increase cannot be piled on top of other cost increases without price relief." If Washington fails to say "yes" to the agreement, Westinghouse and IUE must reach another accord by July 16 to avert a strike.

Union Shop—A modified union shop provision is included in the labor agreement. It provides that, effective June 1, union membership shall become a condition of employment for present union members in all IUE bargaining units which have voted for such security and have received National Labor Relations Board certification.

Present employees who are not members of the union need not join, but new employees, rehires and transfers must sign up within 45 days after the date of their employment.

Freight Car Program Keeps U. P. Shops Humming

U. P. OPEN-AIR ASSEMBLY LINES AT DENVER IN FULL SWING
. . . turning out 500 new flat cars and 950 reconditioned stock cars

ROLLING into service each day from Union Pacific railroad shops at Denver are four new flat cars and four reconditioned stock cars.

Goal of the Denver shops is 500 new flat cars and 950 reconditioned stock cars. About 300 of each have already rolled off the parallel open-air assembly lines. For the first time, UP is constructing flat cars from rivetless underframes cast in one piece. General Steel Castings Co., Granite City, Ill., is pouring and shipping four of the 22,000-pound underframes each day.

When they arrive at Denver, the underframes are lifted by Gantry crane onto iron horse supports where workmen immediately begin adding draft gear, yoke and brake equipment. Assembled car trucks are coasted on the truck transfer table from the asembly station to the track and underframes are lowered onto them. In six days a new car is completed.

CRANE LOWERS UNDERFRAME
. . . a new flat car takes shape

Employment Up to 61.2 Million

Employment advanced by 1 million between April and May, with the usual midspring expansion in farm activity. Total civilian employment was estimated at 61,193,000 in the week ended May 12, compared with 60,040,000 for the week ended Apr. 14, the Census Bureau reports.

Estimated at 53,753,000 in May, nonagricultural employment was at the high level prevailing in March, just before the Easter holidays. A further expansion in construction activity, along with some recovery in trade after a post-Easter slump, accounted for most of the gains. Nonagricultural employment continues at a level some 2 million above that of a year ago. Agricultural employment advanced by 800,000 to an estimated 7,440,000 in May.

Unemployment was estimated at 1,609,000 in May, compared with 1,744,000 a month earlier. The jobless reduction from January to May amounts to 1 million. Only about 2.6 per cent of all civilian workers in May were out of jobs, compared with 4.1 per cent at the beginning of 1951 and 4.9 per cent in May, 1950.

Women, Handicapped Jobs Gain

Nonagricultural job placements effected by local offices of the state employment services during the first four months of 1951 totaled about 2 million and were 45 per cent greater than in the same period a year ago, says the Labor Department's Bureau of Employment Security.

Placements of women and handicapped workers in nonfarm jobs were substantially greater than during the first four months of 1950. Job placements of women aggregated 757,600, compared to 597,600 during the 1950 period.

Handicapped placements totaled about 90,000, compared with 50,000 in 1950.

Snafu in Defense Loans

New act leaves interest limits, CPR 30 as major loan barriers

CONTRARY to wide expectations, the new defense loans act is not facilitating loans to defense contractors by private banks. In nullifying the comptroller general's ruling that loaning banks may be liable for excess profits or taxes held recoverable by renegotiation boards or the Bureau of Internal Revenue, the new law removes a real hazard. But there still are two big stumbling blocks.

One is the Federal Reserve Board limit of 5 per cent (including insurance) as the maximum interest on V-loans. The average bank regards this as sufficient interest on loans of $100,000 or more, but claims a higher rate is necessary on smaller loans to cover costs and return a profit. On really small loans—$5000, say—the prevailing interest is 8 to 9 per cent.

The other stumbling block is the lack of any provision in CPR 30 to permit inclusion as an item of cost interest on capital loans. Many contractors and subcontractors working on defense or defense-support goods not exempted from price control are under a terrible handicap when faced with the necessity of having to pay 5 to 9 per cent interest on borrowed working capital.

The whole situation is a mess—not helped a bit by the absence of understanding in some government quarters about the relationship of loans to the overriding need for intensified defense and defense-support production.

Purchasers See Business Decline

Industrial business is on the decline, reports National Association of Purchasing Agents in its survey for May.

Order backlogs have dropped for the third consecutive month, and production is easing off. Defense orders have increased but their effect is not being felt over a very wide area of industry. "The immediate future seems to offer quite gloomy prospects for many manufacturers," says NAPA. Material allocation under CMP is not expected to help much in the third quarter.

Employment reductions, both in number and work time, are reported by 16 per cent, the largest number showing that condition since March, 1950. Buying policy is reported by 83 per cent to be within the 90-day spread, with a definte trend to 60 and 30 days, confirming the shortened order books.

MARKET FOR HARDWARE: Producers of metal products for furnishing ne homes must give increasing attention to the prefabricated homes market. Th Fargo model is priced at $6100 f.o.b. Lafayette, Ind., plant of National Hom Corp. The company's assembly lines turned out 9854 units in 1950

STEEL's Weekly Summary of Subcontract Opportunitie

ACQUISITION of Chase Aircraft Co. stock by Kaiser-Frazer Corp. makes possible a switch in the lineup of military aircraft contracts committed to Kaiser and Fairchild Aircraft Corp.

One result may be an opportunity for subcontractors to supply Kaiser in a new production program said by the Department of Defense to be of "maximum acceleration." Effect of the switch will be to make Willow Run the home of the Chase C-123 assault transport and remove production of Fairchild's C-119 Packet to a government plant at Orchard Place, Chicago.

Work on the Packet is just starting at Willow Run, while Fairchild has been authorized by the Air Force to prepare the Chicago facility t make the same plane. When the Ch cago site is reactivated, Kaiser wi change designs and make the C-12 as its only aircraft job. Tooling ha been started by Chase to prepa Willow Run for the changeover.

Addition of the Air Force plant Fairchild's expanding Packet produ tion plans is coupled with another e pansion at the company-owned pla in Hagerstown, Md., says Richard Boutelle, company president. March 31, the company had $125 m lion of unfilled defense orders, pl $50 million more then unassigned the government.

Other contracts, awarded to t metalworking industry, follow:

PRODUCT	CONTRACTOR
Chain Hoists	David Round & Son, Cleveland
	Philadelphia Div., Yale & Towne Mfg. Co., Philadelp
	Wright Hoist Div., American Chain & Cable Co., York,
Pumps	Gould Pumps Inc., Seneca Falls, N. Y.
Pumps (with hydraulic turret)	Oilgear Co., Milwaukee
Pumps (trailer-mounted, asphalt)	Littleford Bros. Inc., Cincinnati
	Rosco Mfg. Co., Minneapolis
Scrapers	R. G. LeTourneau Inc., Peoria, Ill.
Derricks	Gar Wood Industries, Chicago
Trailers	Hobbs Mfg. Co., Fort Worth, Tex.
Hoisting Units	Brooks Equipment & Mfg. Co., Knoxville, Tenn.
Air Compressors (trailer mounted)	Davey Compressor Co., Kent, O.
Rigging Equipment	R. Cooper Jr. Inc., Chicago
Dischargers & Pressure Primers	Standard Oil Co. of Calif., San Francisco
Elevator Mechanical Hoisting Equipment	C. H. Wheeler Mfg. Co., Philadelphia
Utility Trucks	Market Forge Co., Everett, Mass.
	Star Mfg. Co. Div., Hercules Steel Products Corp., Galion,
Semitrailers	Highway Trailer Co., Edgerton, Wis.
Engines	Willys-Overland Motors Inc., Toledo, O.
Convection Heaters	Modine Mfg. Co., Racine, Wis.
Shelters	Alma Trailer Co., Alma, Mich.
Valves	Ohio Injector Co., Wadsworth, O.
	Crane Co., Philadelphia
Horn & Valve Assemblies	Walter Kidde & Co., Belleville, N. J.
Gages (pressure, air, oil)	Manning, Maxwell & Moore Inc., Stratford, Conn.
Electric Box Furnaces	Coates Electric Mfg. Co., Seattle
Adapters	John Bean Div., Food Machinery Corp., Lansing, Mich.
Amplifier Assemblies	Electronic Tube Corp., Philadelphia
Power Units	Jacobsen Mfg. Co., Racine, Wis.
	John R. Hollingsworth Corp., Clifton Heights, Pa.
	O'Keefe & Merritt Co., Los Angeles
Transformers	Allis Chalmers Mfg. Co., Milwaukee
Starters	Jack & Heintz Precision Industries Inc., Cleveland
Rectifiers	Magnaflux Corp., Chicago
Switches	General Communication Co., Boston
Electric Motors	Reliance Electric & Engineering Co., Cleveland
Switchgear	General Electric Co., Schenectady, N. Y.
Thermostatic Switches	Manning, Maxwell & Moore Inc., Bridgeport, Conn.
Mobile Radiographic Units	H. G. Fischer & Co., Franklin Park, Ill.

CHECKLIST ON CONTROLS

Materials Orders

IRON & STEEL—Amendment No. 2 to NPA Order M-47 removes restrictions on the use of iron and steel for school desks and seats for the rest of the second quarter of 1951. Makers of school desks and seats had been limited to a usage rate of 80 per cent of the amount of iron and steel they consumed in the first half of 1950. NPA expects to make provision under the Controlled Materials Plan for third quarter use of iron and steel for school desks and seats. Amendment No. 2 to NPA Order M-47 was issued May 29, 1951, and made effective on that date.

CANS—Amendment No. 2 to NPA Order M-25 permits use of 0.25 tin plate for small powdered whole milk cans until July 31, 1951. The amendment also relaxes certain other restrictions on use of tin plate for containers of other milk products. Amendment was issued May 31, 1951, and made effective on that date.

METAL PRINTING PLATES — NPA Order M-65 issued May 31,1951, and effective that date, limits the time obsolete metal printing plates can be held by various types of printing establishments. Excepted from provisions of the order are plates made only of lead, tin and antimony.

GRAPHITE, ELECTRODES — NPA Order M-66 issued May 31, 1951, and effective that date, puts artificial graphite and carbon electrodes under NPA allocation July 1, 1951, and sets up inventory limitations.

IRON & STEEL—Amendment of June 1, 1951, of NPA Order M-47 permits makers of passenger automobiles and station wagons to use during June, 1951, as much as 40 per cent of the amount of iron and steel they were allowed for the second quarter of 1951. Permitted use during that quarter was 78⅓ per cent of the average quarterly use in the first half of 1950. During April and May, companies operated at 80 per cent of their rate of base-period usage. Their monthly use was limited to 40 per cent of permitted quarterly use. To obtain more steel for defense and defense-supporting production, NPA on May 4 reduced the June use of steel for auto manufacturers to 75 per cent of the rate of base-period usage. The June 1 amendment is to eliminate hardship for auto manufacturers who had planned the 40 per cent of the permitted quarterly use for June production.

IRON & STEEL—Amendment No. 1 issued June 2, 1951, to NPA Order M-47 reduces the amount of iron and steel that can be used in most consumer durable goods in the third quarter of 1951 at 70 per cent of the base period rate of consumption. The amendment also permits the base period to be either the first half of 1950 or the last half of 1949. During the second quarter of 1951, use of steel for consumer durables was limited to 80 per cent of the average quarterly use during the first half of 1950. After July 1, 1951, automobiles will not be on the list of consumer durable goods covered by M-47; use of steel in them will be controlled by a separate order. Some additional products have been placed on the list of those affected by M-47. Amendment No. 1 to M-47 is effective July 1, 1951.

ALUMINUM FOIL—NPA Order M-67 issued June 1, 1951, and effective that date, limits aluminum foil used in protective packaging to a thickness of 0.005 inch or less. For packaging of some products there is no consumption limits on the foil; others are limited to 100 per cent of the base period rate of usage; some to 90 per cent; and others to 65 per cent. Exempted from the order are defense-rated orders and orders for foil to be used as bottle cap liners and other packaging closures regulated by M-26. Otherwise, all uses of aluminum foil are now covered by M-67. Previously, foil usage was governed largely by M-7.

ALUMINUM—Amendment of June 1, 1951, to NPA Order M-7 provides that retail dealers who must assemble aluminum parts at the point of installation are exempt from M-7's provisions limiting assembly to 50 per cent of the base period rate. This change is designed chiefly to aid aluminum awning retailers who must sell and assemble their products during the summer months. The amendment also (1) increases permitted use of aluminum to make aluminum wool for aircraft maintenance and automotive air filters from 50 per cent to 65 per cent of the base period rate of usage; (2) shifts use of aluminum for containers and packaging to coverage under NPA Order M-67; (3) adds emphasis to prohibition of aluminum in architectural and building ornamentation; and (4) states that when a use of aluminum is exempted from M-7 the amount of aluminum used in exempted products must be deducted from the total base period consumption in computing a manufacturer's present permitted usage. The June 1 amendment was effective on that date.

OIL & GAS INDUSTRIES—Amendment of June 1, 1951, to NPA Order M-46 provides priorities assistance for United States and Canadian operators for production and construction operations and gears this assistance program into the Controlled Materials Plan which will become effective July 1, 1951. Until this amendment, priorities assistance for the petroleum and gas industries was limited to MRO materials and oil country tubular goods for oil and gas operators within the United States. The amendment provides priorities assistance for all types of production operations.

OIL & GAS INDUSTRIES—NPA Order M-46B issued June 1, 1951, and effective that date, divorces the petroleum and gas industries from control under NPA Order M-4 (construction) and gives them a separate order to govern their construction.

ELECTRIC UTILITIES—Amendment of June 5, 1951, to NPA Order M-50 formally adds steel as a program material to copper and aluminum supplies previously earmarked for the electric power industry.

PASSENGER CARS—NPA Order M-68 issued June 2, 1951, and effective July 1, 1951, limits the use of steel, copper and aluminum in passenger automobiles during the third quarter of 1951, without a direct control on unit production. NPA said the limitations will have the effect of reducing output 37 per cent from the third quarter 1950 output. An auto manufacturer's permitted use of steel, copper and aluminum during the third quarter of 1951 will be regulated by: (1) Amount of each material used per car in January, 1950, production; (2) the company's relative standing in the industry; and (3) the industry's authorized rate of production for the purpose of measuring the use of materials.

SULPHUR—NPA Order M-69 issued June 1, 1951, and effective that date, orders sulphur suppliers to ship sulphur only when authorized by NPA, and limits sulphur users to 100 per cent of last year's rate of consumption. The restriction on use became effective June 1; authorization to suppliers will begin July 1.

NPA Delegations

FUEL OIL TANKS—NPA Delegation 13 issued May 25, 1951, and effective that date, authorizes the Petroleum Administration for Defense to assign defense order rating DO-48 to purchase orders for steel required in construction of petroleum and gas storage facilities.

OIL, GAS—Amendment of June 1, 1951, of NPA Delegation 13 gives the Petroleum Administration for Defense the authority to issue authorizations for procurement of materials by petroleum and gas producers, subject to such conditions as the administrator of PAD may deem appropriate. This amendment clarifies PAD's authority in connection with NPA Order M-46.

SFO Order

COAL & COKE OPERATORS — Amendment 1 to SFO-1 by the Defense Solid Fuels Administration extends to June 30, 1951, the deadline for filing reports by coal and coke operators on facilities they operate. The amendment, issued May 29, 1951, was effective that date.

Price Regulations

NICKEL — Supplementary Regulation 33 to the General Ceiling Price Regulation permits sellers of primary nickel products and sellers of rolling mill, foundry and similar products containing more than 5 per cent nickel to adjust their ceiling prices to reflect the increase of 6 cents per pound in the price of nickel which was approved by the Canadian government, effective June 1, 1951. Supplementary Regulation 33 was issued June 1, 1951, and became effective June 2.

ZINC SCRAP PRICES—Ceiling Price Regulation 43 issued by the Office of Price Stabilization June 1, 1951, and effective June 6, 1951, sets new dollars-and-cents ceiling prices on zinc scrap substantially below prevailing market levels.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Government officials are saying the thousands of agreements that have already been signed for wage increases above 10 per cent will be disapproved by WSB

DON'T BE MISLED by Eric Johnston's statement to the House Labor Committee that the government ought not negotiate wage increases covering plants it may seize in the future. Mr. Johnston has nothing to do with the seizure of plants or their operation (and he made it clear that he was expressing his own opinion only).

STEEL got confirmation from government attorneys about the administration's labor policy. In effect the policy freezes a pattern that was improvised in the past. It should protect the country against any prolonged strikes in the future. Here's how the policy shapes up, government officials say.

Fast—The ban on wage increases beyond 10 per cent above the level of Jan. 1, 1950, will continue. A great many of the recently signed agreements calling for greater increases will be disapproved by the Wage Stabilization Board as fast as it can get to the individual cases. Where disapproval is registered, it is expected that managements and unions involved will write new agreements acceptable to the Wage Stabilization Board.

It's logical to expect some disputed cases. Two approaches to a settlement are open then: 1. When both sides are willing and agree to abide by the award, WSB will serve as arbitrator. 2. When national interest is involved WSB will serve as a fact-finding body and will come up with recommendations — not necessarily binding on the parties.

Furious—If the parties don't accept the proposed settlement, the President may seize the plant and operate it. After seizure, the government will use persuasion and near-coercion to settle the fight.

Industry Men in Government . . .

Steel industry figures will occupy newly created top posts in NPA's Iron & Steel Division. Herbert Johnson, Jones & Laughlin Steel Corp., was appointed assistant director for distribution, and J. S. Smith Jr., Inland Steel Co., assistant director for production. Mr. Johnson assumed his new duties and Mr. Smith will report later in June . . . W. B. Quail, Armco Steel Corp. was recalled to the Iron & Steel Division to serve as deputy director which office, under the rotational plan, will lead to his appointment as successor to the present director, Richard F. Sentner, United States Steel Co., after the latter completes his term—probably six months hence . . .

First industry representative appointed an executive in NPA's Copper Division is Joseph W. Mullally. On leave from Anaconda Wire & Cable Co., New York, he was made deputy director. Other officers of the Copper Division are Commerce Department career men; Frank H. Hayes is acting director, and A. A. Meyrowitz was named assistant director . . .

More industry men were brought into the Munitions Board. Frank G. Chambers, Magna Engineering Corp., San Francisco, is chief of the board's Office of Priorities & Controls. William Harrigan, Rutherford, N. J., retired as an engineer with Texas Co., New York, is director-co-ordinator of four of the board's standardization agencies—Standards Agency, Inspection Agency, Cataloging Agency, and Packaging Agency . . .

A delegate from small business was designated by the Defense Department as its special advisor on policies toward a small business and to serve as the Munitions Board's liaison on small business for the National Production Authority and other government agencies. He is Richard Lennihan, small merchant and manufacturer, of Vineyard Haven, Mass.

J. S. SMITH JR.
. . . iron and steel production

W. B. QUAIL
. . . deputy director, Iron & Steel

HERBERT JOHNSON
. . . iron and steel distribution

Watch Your Step in Buying Foreign Steel

Prices are high, but you may be able to shave them if you have something to barter, such as coal or steelmaking equipment

ARE YOU considering buying foreign steeel to eke out your present supplies?

If you are, face the facts. Foreign steel is expensive, generally falls below American standards in quality and comes wrapped in red tape.

Word of Warning—There are two ways to buy foreign steel: From American brokers — concentrated in New York— who deal in the material or direct from European mills or their representatives. Some Japanese steel is available, but it is a minor factor in total ferrous imports. If you buy from reputable American brokers, you save the headache of complicated foreign financing and shipping, what's more, quality is guaranteed by the dealer. Yet you pay for the quality guarantee and the relief from red tape. The foreign steel market is highly volatile, but last week $\frac{5}{8}$-inch plates were bringing about $9.75 per cwt, one of the lowest quotations in several weeks. Prices of other finished products are comparable. If you pay that money for steel, you probably can't afford to do it for long unless your product's cost is not predominantly in steel.

If you must get foreign steel at prices closer to domestic levels, you may make a deal direct with overseas mills—when you make your approach with something to barter. Coal is a good bargaining agent in France, Belgium, Luxemburg and West Germany. Steelmaking machinery is the open sesame anywhere in Europe. Without the bartering goods, you perhaps could make a direct deal, but by the time you added in your inspection, shipping and financing charges to the mill's export quotation, you would be paying about the same as you would to a dealer.

What To Do—If a barter deal has been made, insist on quick delivery, send your own man abroad to supervise inspection and shipping arrangements and be certain you have a reliable testing firm doing your inspection. Most American companies with overseas offices can be counted on. A good European testing company is Lloyd's. In your purchasing be cautious when ordering plates 1 inch and heavier, for they may be salvage material.

During the first and second quarters this year, some 30,000 to 40,000 tons of finished steel products were imported a month. The bulk of that entered this country via east coast ports. Some 10,000 tons a month of the 30,000 or 40,000 arrived in gulf coast ports. Most of the finished steel imports was in plates 12 gage down to ½-inch. Plates are a popular import product because they are subject to less damage in shipping than most other items. The tonnage outlook for steel imports in the next few months is less promising because South American countries are heavy bidders for the European material and have succeeded in lining up more contracts for the third quarter than for either the first or second.

U.K. Exports Up 26 Per Cent

British steel exports to U. S. in the first four months of 1951 were 26 per cent above the level of the same 1950 period, but shipments were a little below those for the last quarter in 1950.

Full control of all British steel is likely soon. An allocation and licensing scheme is expected that will resume the system abandoned about a year ago for all steel products except sheets and tinplate which were never decontrolled.

Improvements in the raw materials position should enable Britain's steel production to be maintained at the rate of 17.9 million net tons annually in 1951 and 1952, says British Iron & Steel Federation. A rate of 20.2 million tons annually is possible by 1954 or 1955. With the decline of German supplies of scrap, the industry may be unable to obtain more than about 620,000 tons of imported scrap this year, compared with nearly 2,128,000 tons last year. Ore imports may drop, but domestic production will increase, from 14,310,000 tons now to 16,016,000 tons.

France Short of Coking Coal

French steel production hovers around 825,000 net tons of ingots a month. Coal is one factor limiting output, even though per capita production is steadily rising and is now about 32 per cent above the 1929 level.

All French steel mills are loaded to the gills with orders, and delivery delays of at least a year now are expected in some products.

Ruhr Steel Gains Limited

Ruhr steel producers are dependent now on American coal to boost their output much further.

Exports—particularly U. S. markets —are being carefully nurtured, so that domestic consumers suffer. The result is a steel allocations system modeled after U. S. controls. German producers are fighting now for a government subsidy on steel sold in the country because export prices are so much higher than domestic. The subsidy would not be direct, but would be figured on a complicated basis involving a percentage of the profit on steel-using goods exported.

Authenticated

ASSEMBLY LINES MOVING: This small bus is only one of several models of Volkswagen in production at Wolfsburg, Germany. A new line of trucks, busses and ambulances have been added to the normal production of small passenger cars

Defense Production Directory

TO EXPEDITE SERVICE Defense Production Administration and National Production Authority arranged to have all of their divisions serviced by a single giant telephone switchboard—STerling 5200. Incidental to the switch virtually all extensions were renumbered. STEEL herewith presents an address and telephone directory of DPA and NPA corrected to date

Defense Production Administration

Old GAO Bldg. except as noted—STerling 5200

Acting Administrator: Edwin T. Gibson, Room 206, Ext. 4423.

Deputy Administrator for Resources Expansion: Maj. Gen. Thomas F. Farrell, 4th Floor, Ext. 5246.

Deputy Administrator for Small Business: John C. Pritchard, 3312 Commerce Bldg., Ext. 3561.

Director, Program and Requirements Division: Charles E. Wampler, Ext. 5314.

Director, Materials Policy Division: J. Morgan, Room 211, Ext. 3231.

Director, Conservation Coordination Division: Howard Coonley, Room 211B, Ext. 3401.

Chairman, Electronics Production Board: Edmund T. Morris Jr., Room 214, Ext. 4781.

Director, Defense Production Inquiry Center, Main Lobby: K. H. Bristol, Ext. 3238.

Acting Director of Public Information: Edward K. Moss, 5111 Commerce Bldg., Ext. 3564.

Acting Deputy Director of Public Information: Albert J. Lubin, 5111 Commerce Bldg., Ext. 3564.

NATIONAL PRODUCTION AUTHORITY

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Waves of the Future

Demand in next five years will be for capital goods, military items, consumer durables

New explosions of peak demand and productivity will not be limited to the area of military goods, but will occur in every phase of the nation's economy during the next five years, says Chester H. Lang, General Electric Co., vice president.

He believes the first wave of demand will be for producers' equipment. That will reach its peak in 1951 and will mark the first phase of the mobilization plan. The production spurt in that field will last, he predicts, until 1953 when the index for producers' equipment will drop.

The second in the staggered series of production peaks will be in tanks, planes and other military durables, Mr. Lang says. That series will reach its high point in 1953. That in turn will be succeeded by a spurt in consumer durables with an anticipated peak in 1954. Mr. Lang cautions that all his predictions must be scrapped in case of allout war.

New Engineers Go to War

Only about half of the 38,000 graduating with engineering degrees this month will be available for industrial employment, Engineering Manpower Commission of Engineers Joint Council estimates. Some 19,000 will be claimed by the armed services.

RFC Lends to Metalworking

Loans recently made by Reconstruction Finance Corp. to companies in metals industries include these:

Davey Compressor Co., Kent, O., manufacturers of compressors, $550,000, for working capital, for three months.

Phalo Plastics Corp., Worcester, Mass., $665,000, for working capital, for one year.

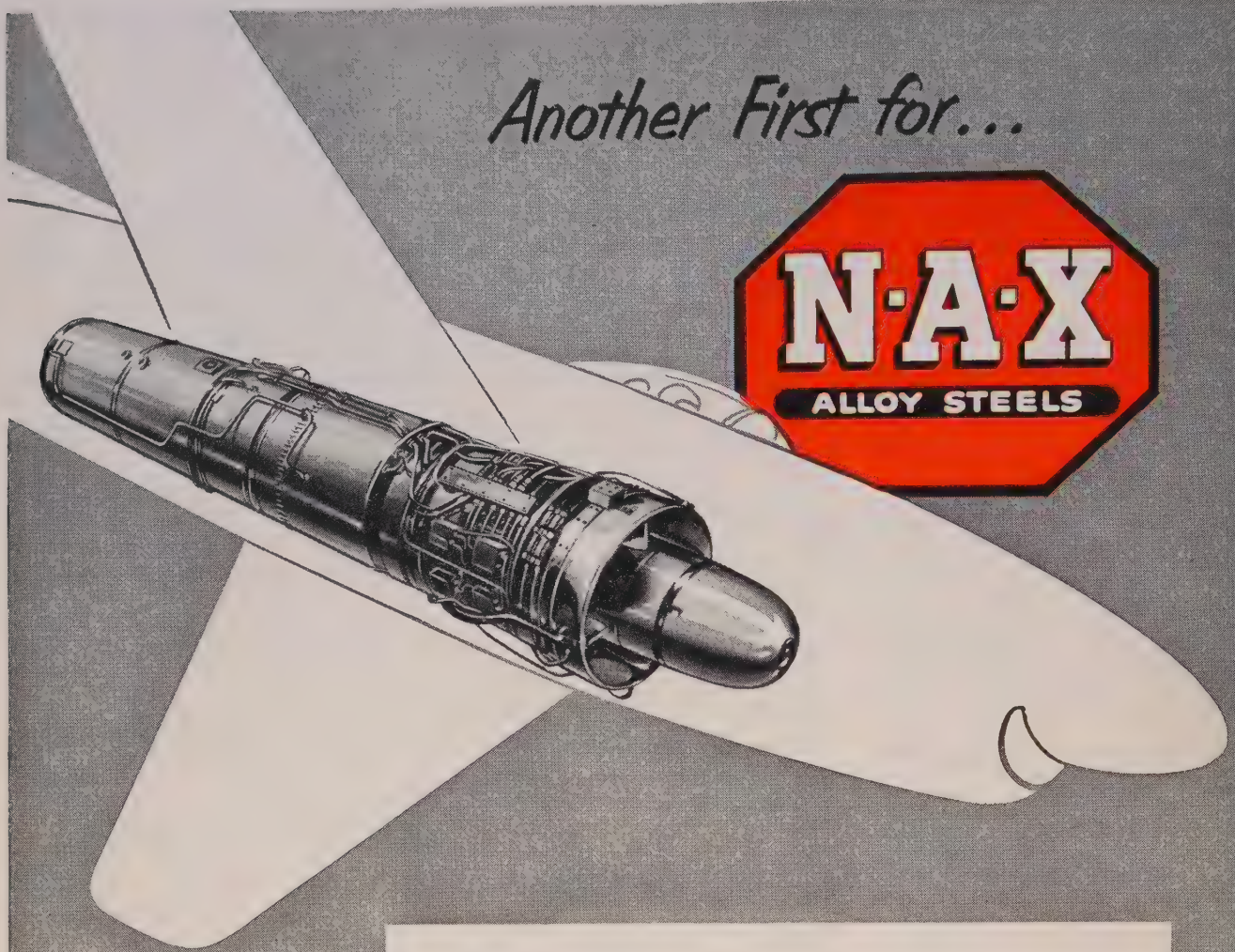
Northrop Aircraft Inc., Hawthorne, Calif., manufacturer of airplane parts, $5,000,000, for construction, for five years.

Portland Copper & Tank Works Inc., South Portland, Me., fabricator of heavy metal tanks and industrial machinery, $650,000, working capital, for two years.

LaPointe Machine Tool Co., Hudson, Mass., manufacturer of broaching machines and cutting tools, $500,000, for machinery and equipment, five years.

Sharon Tube Co., Sharon, Pa., manufacturer of black welded steel pipe, $1,125,000, construction and working capital, six years.

Another First for...



The use of N-A-X ALLOY STEEL in Aircraft Gas Turbines saves up to 50 per cent of critical Stainless Steel.

Conservation is possible — without sacrifice with use of N-A-X ALLOY STEELS

With the demand for greatly increased quantities of the critical and strategic Stainless Steels used in Jet Engines intensified by the acceleration of the building program, the Air Force requested the producers of these engines to seek *suitable* material with less critical alloy content to replace the Stainless Steel for certain moderate temperature application in these aircraft gas turbines.

The steel selected had to be of low-alloy content with high strength and good welding characteristics. Ordinary low carbon steel did not meet the requirements because of its low tensile properties and the fact that it could not be satisfactorily welded by the inert arc process, which is widely used in aircraft gas turbine manufacture.

The data available from tests made on several weldable low-alloy, high-strength steels indicated that N-A-X ALLOY STEEL was the most satisfactory of the group — *its selection followed.* Unlike other possible substitutes, N-A-X ALLOY STEEL has good low temperature impact values, maintains its higher strength and is not subject to temper brittleness in the wide operating temperature range required of the steel for this purpose — from a low of −70°F. to +800°F.

The use of N-A-X ALLOY STEEL for this application has cut the amount of Stainless Steel required in half. This is of considerable importance to the Air Force.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division — Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

NPA Order M-68 is a remarkably simple way of giving auto producers leeway in deciding just how many cars they want to build. The order's Section 8, though, needs clarification

DETROIT

THE FIRST THING Courtney Johnson did when he took over as director of NPA's Motor Vehicle Division a few months ago was to ask the passenger car industry to supply him with production figures for several years back and data on unusual occurrences such as strikes, model changeover periods and other incidents that upset normal production. The result of his research was NPA's M-68.

Through M-68 the industry's normally fluid structure is frozen. Companies are assigned positions adhering closely to their "normal" take of the automotive market.

Taking Exceptions—Courtney Johnson is no bureaucrat. He understands the auto industry inside and out. He realized that no given period would provide a fair base on which to establish production limits for all car makers. He also knew that to control production harsher limitations than those previously laid down would be necessary. Materials use limitation orders were working after a fashion but did not result in overall savings of scarce metals in the way they were designed to do. The reason was that exception after exception had been made to the base period; the result was about only 2 per cent fewer cars were made in April and May of this year as compared with last year's first half production rate.

That situation will not be possible under M-68 going into effect July 1. A moderately flexible limit of 1.2 million passenger cars has been established for third quarter. The production is assigned to automakers on these percentages: General Motors 41.35, Chrysler 21.65, Ford 21.35, Studebaker 4.25, Nash 3.3, Hudson 2.95, Packard 2.15, Kaiser-Frazer 1.55, Willys Overland 1, Crosley 0.35, and Checker Cab 0.1.

At No Given Instant—Even the most cursory glance at these percentages reveals that they weren't arrived at with any mathematical precision and that they didn't freeze the companies in their relative positions at any given instant during the past several years. It is evident, too, that the line-up doesn't do justice to the competitive standings of several producers in the first five months of this year. But it is conceded in the industry that the percentages are much more equitable than those derived by taking first half of 1950 as base. In explaining NPA's derivation Mr. Johnson said they take into account company production from 1947 to date, trends in the industry, special problems of individual companies, and (this consideration is implied rather than expressed) the breakeven point.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	615,688	609,878
February	658,918	505,593
March	802,737	610,680
April	680,257	585,705
May	695,000*	732,161
June		897,853
July		746,801
August		842,335
September		760,847
October		796,010
November		633,874
December		671,622

Week Ended	1951	1950
May 19	156,111	178,314
May 26	158,259	186,249
June 2	123,481	146,825
June 9	165,000	200,515

Sources: Automobile Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Remarkably Simple—The order has been characterized in some accounts as setting forth a complicated formula for the car makers to follow. It is, in fact, a remarkably simple way of giving the producers leeway in deciding just how many cars they want to build. It does not say to General Motors for example, "You will be allowed to produce 496,200 cars next quarter." Instead it provides a method by which each company determines how much of each of the controlled materials—steel, copper and aluminum—it is permitted to use, and then lets it use those tonnages any way it sees fit. That's accomplished by providing that the 1.2 million car base be multiplied by each producer's percentage rather than by the average per car consumption of each of the three metals in January, 1950.

Car Output: Purely Guess—A typical 3824-pound car in 1950 contained 2556 pounds of steel, 11.39 pounds of aluminum and aluminum alloys and 41.6 pounds of copper and copper alloys. If that had been the average use in January 1950 by, say, Chrysler divisions (and the average would be found by dividing total consumption of each metal by number of cars produced), its third quarter consumption limits would be figured at 332,000 tons of steel, 1480 tons of aluminum and 5403 tons of copper. If it wanted to it could use all its metals quotas for production of Chrysler Crown Imperial Limousines or for Plymouths. The built-in flexibility of this order does away with the unit limitations that car makers have bitterly opposed and precludes any accurate guessing as to how many cars will actually be produced next quarter.

Courtney Johnson is convinced that a greater percentage of light cars will be built. But the automakers will react to the order by producing the cars offering the greatest economic advantage and competitive opportunity. Of course a savings in steel in one model against another does not mean a corresponding saving in copper or aluminum; so one or the other of these will probably be the deciding factor on how many cars of a given model are produced.

Section Eight—M-68 in no way assures the makers of getting their quotas of the metals. These remain on the same catch-as-catch-can basis as before. As the car makers got deeper into the study of the order last week they hauled out one section, No. 8, which many feel will need further clarification. Though that part of the order releases the vehicle makers from previous materials use limitation orders (M-7 on aluminum and M-12 on copper), it does not appear to have the same effect on their suppliers. Unless changed Section 8 is bound to complicate the third quarter picture seriously for companies buying copper and aluminum-containing components.

Possible Balk — Another section which may be the subject of some dispute pertains to passenger cars ordered with DO ratings. These must be produced within the metals quotas laid down by the formula. Companies now producing cars for the military services may be inclined to back

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off from additional contracts since their share of the civilian market will suffer accordingly.

Materials substitution that makers adopted prior to June 1 must be continued. Where they changed the bill of materials for the January, 1950, car on which the whole formula is predicated, the quota of the affected metals is to be adjusted accordingly. The freeze on substitute materials throws a wet blanket on the hopes of some of the makers who thought they'd be able to get back to their original metals, particularly aluminum, if the supply situation eased later this year. Use of secondary aluminum for pistons is mandatory under this order for car makers not switching to cast iron.

Stretch-Work Proviso — Another feature of the order—presumably included to keep production high as long as possible through the summer and until more workers can be assimilated into the defense program—is that a maximum of 40 per cent of the quarter's output can be made in any month. This stretch-the-work provision may mean at most a half-month layoff during the quarter for companies able to sell all the cars they are permitted to produce.

Is Big Business Really Favored?

When one of the large automakers receives a government contract, the comment is frequently heard that big business is being favored again. To straighten out this line of thinking has become a crusade for many of the industry's spokesmen. The Automobile Manufacturers Association, for one, takes the stump often to explain that coincident with high sales volume is also high purchasing volume, a self-evident but frequently forgotten fact.

It finds that the broad base on which the industry depends for its supplies is even further broadened when its products include military items.

Instances of small companies unable to get enough materials to support their peacetime operations or defense contracts to occupy their machinery are legion. By and large these companies get sympathy and understanding from their congressmen. Enough worry over their welfare has been generated in both houses of Congress that activation of a 1951 version of the Smaller War Plants Corp. of World War II is a distinct possibility.

For Instance—What happens when an automaker gets a defense contract is a case in point. Take Chrysler Corp. More than 1200 companies have been lined up as suppliers for defense work now on its books. An additional 2000 are now being singled out to provide parts and materials as the company's defense assignments take shape. More will be added later, Joseph Pfeiffer, director of purchases, says. In World War II ten times the number of suppliers as were used prior to the emergency were enlisted to help it with its war work.

At present, Pfeiffer says, his company is a customer of 8500 firms in 1247 towns, 41 states and four foreign countries. Last year more than 62 per cent of the company's total income was paid out for their products. Of Chrysler's current suppliers 88 per cent have the small business tag, employing less than 500. Nearly 6000 of the companies employ less than 100, and only about 500 of its vendors are found in the 1000-and-over class.

Mr. Pfeiffer said that the tank program to be conducted in a plant under construction at Newark, Del., will require equipment and parts and materials that will be supplied by about 1000 companies.

A like number will be needed to supply the tank engine plant at New Orleans. Even Chrysler's relatively minor contract for range finders in an extension being built at its Dayton Airtemp Plant will require 350 suppliers.

The largest category of work which is subcontracted is specialized parts with peculiar facilities and skills. Such items as electronic and electrical equipment, plastic and rubber parts, bearings, ferrous and nonferrous castings and others will be bought.

Besides these, the corporation will subcontract for items needed in larger quantities than the company can itself provide and for those that can be produced more economically by outside sources.

SPEED QUEEN SPECIALTY: W. N. Pearson, director of manufacturing for Speed Queen Corp., Ripon, Wis., points out to M. G. Peterson, buyer of machined parts for Ford Aircraft Engine Division, a part he believes his company can make. The part, unlike anything Speed Queen manufactures for its washing machines or ironers, would use the same type of machine tools and would require a combination of casting and machining operations familiar to Speed Queen employees

Kaiser Moves to Japan

Henry Kaiser's name achieved world-wide fame during the war when it was associated with boats. It bids to come back into new prominence in the transportation field, this time in automobiles. What is said to be the first Japanese-built car of American design since Pearl Harbor has been turned out by East Japan Kaiser-Frazer Ltd. in a plant at Kawasaki City, near Tokyo.

The first car was a Henry J, assembled from components made at Willow Run. Kaisers will also be assembled at the former Mitsubishi plant, starting production rate being 500 units a year.

The operation is the fifth established by K-F outside the United States in the last three years. Others are at Haifa, Toronto, Mexico City and Rotterdam.

The Business Trend

Activity index takes big dip as holiday pause cuts output but should recover quickly and continue in June at high levels of April-May

INDUSTRY is getting back in stride quickly after its short breathing spell during the Memorial Day week. In some industries the day's production losses will be made up by longer hours in June. But in others, notably the auto and certain hard goods lines, the respite was welcome because short materials supplies and high inventories are deterring full-speed output anyhow.

Lowering the boom on industrial output, Memorial Day observances caused STEEL's activity index to drop to 204 per cent of the 1936-1939 average in the week ended June 2. This skid from the prior week's final reading of 218 marked the lowest point the index has hit since the strike-bound week in mid-February and dropped the index off its high crest of the past 15 weeks. In the comparable week last year the index tumbled 15 points to 195 because of Memorial Day. Carloading operations, auto assemblies and electric power output were hurt by the short week. Steel mills were unaffected and plowed ahead at above-capacity operation to set what will undoubtedly be an all-time record in May.

June activity should see a repetition of the business activity pattern set in the past two months, with production generally steady and firm while industry gets up more steam for churning out armaments. A rosy outlook for the summer months can be predicted by a look at the past: Office of Business Economics figures on sales, orders and inventories for April. The shot-in-the-industrial-arm is the four months backlog of unfilled orders in the hands of durable goods producers at the beginning of May. Though new orders and sales were on the downgrade from the peak set in March, new orders are still ahead of sales and the hard and soft goods makers' backlog of $53.2 billion on May 1 means plenty of work ahead.

No Rest For Steel Mills . . .

Hotter than summer weather is the pace of the nation's steel mills. They operated through the holiday week without pause and turned out 2,053,000 tons of ingots and steel for castings. They should better that output in the week ended June 9, with schedules calling for 2,063,000 tons to be poured. May totals should be in the neighborhood of 9,170,000 tons.

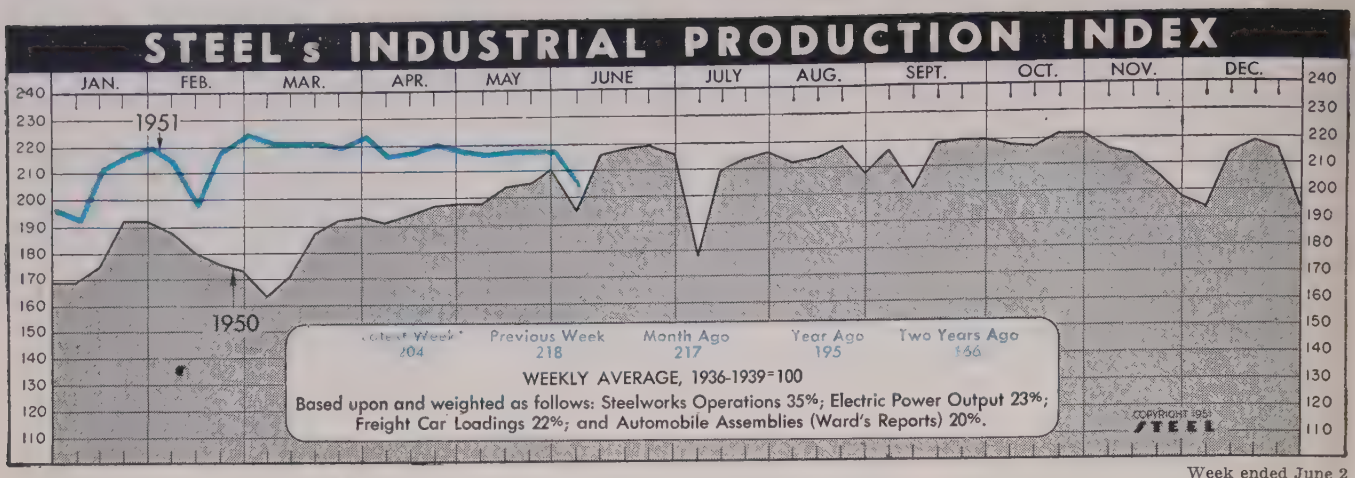
Supplying raw materials for the May turnout also called for strenuous effort. The Great Lakes fleet carried 12,664,095 gross tons of Lake Superior iron ore from upper lake ports in May, a third more than last year's tonnage. This movement, says the Lake Superior Iron Ore Association, brought shipments for the season to 18,875,569 gross tons, nearly double the 9,845,252 tons shipped in the same period a year ago. A 90 million ton year is forecast in shipping and ore-producing circles.

Auto Assemblies Crippled . . .

Factors other than the Memorial Day breather helped take a healthy 24 per cent bite out of auto production in the week ended June 2, says *Ward's Automotive Reports.* Labor disputes caused the chief unscheduled disruption, while materials problems and imbalanced dealer inventories accounted for other shutdowns. U. S.

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	103.0	103.5	103.5	101.0
	Electric Power Distributed (million kilowatt hours)	6,445	6,653	6,560	5,632
	Bituminous Coal Production (daily av.—1000 tons)	1,627	1,620	1,737	1,549
	Petroleum Production (daily av.—1000 bbl)	6,169	6,163	6,174	5,205
	Construction Volume (ENR—Unit $1,000,000)	$373.7	$177.1	$270.6	$205.8
	Automobile and Truck Output (Ward's—number units)	123,481	158,259	154,523	146,825
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	750†	812	803	710
	Business Failures (Dun & Bradstreet, number)	132	191	163	168
	Currency in Circulation (in millions of dollars)‡	$27,461	$27,251	$27,255	$27,088
	Department Store Sales (changes from like wk. a yr. ago)‡	+3%	+4%	+3%	+1%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$11,995	$16,374	$17,076	$11,350
	Federal Gross Debt (billions)	$255.0	$254.8	$254.7	$256.4
	Bond Volume, NYSE (millions)	$10.3	$17.1	$16.7	$12.8
	Stocks Sales, NYSE (thousands of shares)	4,630	8,780	10,147	5,675
	Loans and Investments (billions)†	$69.5	$69.6	$69.9	$67.0
	United States Gov't. Obligations Held (millions)†	$30,382	$30,425	$30,805	$36,359
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	156.13
	STEEL's Nonferrous Metal Price Index‡	241.1	241.6	243.0	176.8
	All Commodities†	182.4	182.4	183.4	156.8
	Metals and Metal Products†	189.4	189.5	189.6	170.4
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
Latest Week 204
Previous Week 218
Month Ago 217
Year Ago 195
Two Years Ago 166
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
COPYRIGHT 1951 STEEL

Week ended June 2

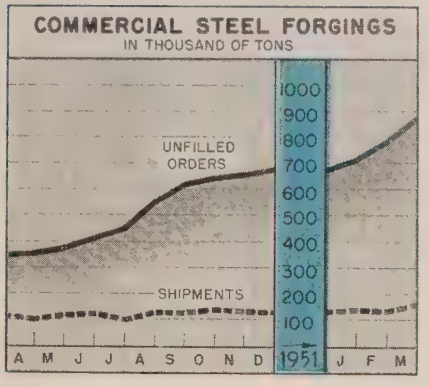
and Canadian assemblies of passenger cars and trucks for that period totaled 123,481 units, as against the previous week's 158,259 and 1950's holiday week total of 146,825. The first five months of 1951 saw approximately 2,620,000 U. S. passenger car completions, compared to 2,387,000 in the same period of 1950. June assemblies will probably be the lowest monthly total of the year—even below January's 495,000 units. In contrast, June of 1950 set an all-time record when 720,000 assemblies were posted. Under present regulations, U. S. automakers will be allowed to turn out in the neighborhood of 1,200,00 passenger cars during the third quarter.

Plant Awards Zoom . . .

After more than 12 weeks of comparative quiet, industrial building contracts awarded zoomed to $127.3 million for the week ended May 31. This figure, reported by *Engineering News-Record,* is considerably below the year's high of $386 million set in February, though nearly 25 per cent above the average week to date this year. Plant awards in the preceding week were only $22.9 million. Total engineering construction contracts for the week amounted to $374 million, well above the year's average. Private housing, with a week's mark of $47 million, is still running nearly 40 per cent below 1950's pace in cumulative volume.

Price Pause Stays . . .

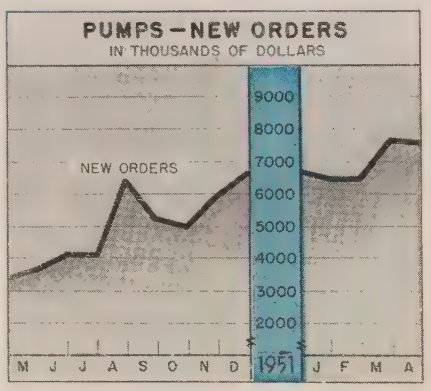
Temporary price stability remains, but there is plenty of confusion as to the future price structure when Ceiling Price Regulation 22 takes full effect. For the present, controls seem to be keeping fairly tight rein on wholesale prices. The Bureau of Labor Statistics' all-commodity index for the week ended May 29 stayed at the same mark prevailing the week before: 182.4 per cent of the 1926 average. This figure was 1.3 per cent above the level prevailing on January



Commercial Steel Forgings
Thousands of Net Tons

	Shipments		Unfilled Orders	
	1951	1950	1951	1950
Jan.	138	93	709	327
Feb.	129	93	781	341
Mar.	161	109	875	350
Apr.	...	99	...	357
May	...	114	...	373
June	...	117	...	408
July	...	95	...	446
Aug.	...	124	...	548
Sept.	...	122	...	620
Oct.	...	137	...	643
Nov.	...	130	...	657
Dec.	...	128	...	674

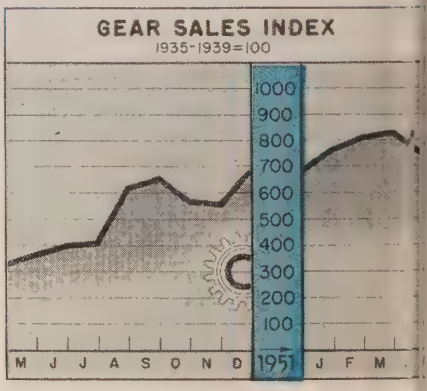
U. S. Bureau of the Census.



Pumps, New Orders
In Thousands of Dollars

	1951	1950	1949
Jan.	6,477	2,586	3,390
Feb.	6,480	2,938	3,247
Mar.	7,654	3,313	3,593
Apr.	7,583	3,376	2,699
May	....	3,668	2,775
June	....	4,153	3,019
July	....	4,080	3,358
Aug.	....	6,429	3,767
Sept.	....	5,191	2,914
Oct.	....	4,985	2,539
Nov.	....	5,961	2,525
Dec.	....	6,720	2,560
Total	....	53,400	36.386

Hydraulic Institute



Gear Sales Index
1935—1939=100

	1951	1950	1949
January	764.6	280.2	320.7
February	809.1	272.9	282.3
March	830.7	358.4	299.1
April	742.5	328.6	339.0
May	....	363.1	250.1
June	....	401.0	227.8
July	....	410.7	193.1
August	....	617.4	262.0
September	....	654.5	224.9
October	....	564.8	242.3
November	....	554.9	230.7
December	....	680.4	242.8

American Gear Mfrs. Association

Charts—Copyright 1951, STEEL

23, 1951 and 16.3 per cent above the pre-Korea monthly average.

Coal Mining Steady . . .

Coal to feed the furnaces of industry is being mined at a satisfactory, though not accelerated pace. Aproximately 9,760,000 net tons of bituminous coal were loaded in railway cars in the week ended May 26, estimates National Coal Association. That's 40,000 tons above the preceding week. Coal stocks above ground are at a comfortable level, but higher weekly production will be necessary to care for the needs of expanding plant and electrical generating facilities.

Buyers Spread Gloom . . .

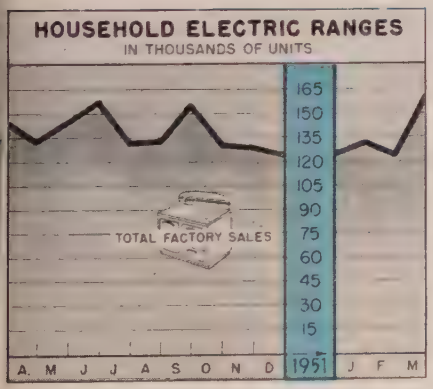
Buyers are seeing soft spots before their eyes: National Association of Purchasing Agents reports 83 per cent of its members' buying commitments are within a 90-day spread, and there is a definite trend to 60 and 30 days. Anticipation of price rollbacks is said to have little to do with formulating this hand-to-mouth buying policy. Even guaranteed price protection has failed to encourage a longer view of the market.

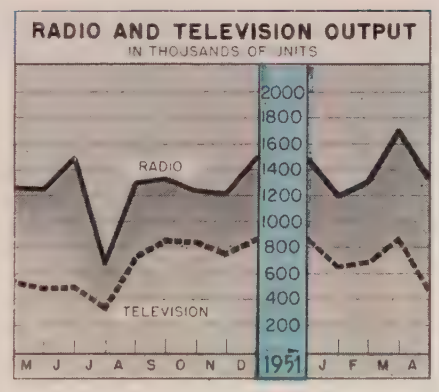
Trends Fore and Aft . . .

Philco Corp. has brought out 11 new television receivers designed for use with an adapter to receive ultra high frequency telecasts and also CBS color signals in black and white . . . Reconstruction Finance Corp. is now making public all current loans approved . . . Sears Roebuck's new catalog will be the biggest ever published. Conspicuous by their absence: Special-priced big-ticket appliances, auto tires, numerous television model offerings . . . Makers of consumer durables will have to include defense items as part of their permitted production in the third quarter . . . Federal Reserve Board's April index held at the high level of March, 222 per cent of the 1935-1939 average . . . Since the outbreak of hostilities in Korea, the railroads and private car companies of the nation have ordered 173,152 new freight cars.

Issue Dates of Other FACTS and FIGURES Published by STEEL

Construction May28	Furnaces, W. Air...May28	Ranges, Gas June4
Durable Goods May7	Gray Iron Castings..May28	Refrigerators May14
Employ., Metalwkg..May21	Indus. Production ..May21	Steel Castings May28
Employ., Steel.....June4	Ironers May14	Steel Shipments May21
Fab. Struc. Steel...June4	Machine Tools May7	Vacuum Cleaners...June4
Foundry Equip. May21	Malleable Castings..May28	Wages, Metalwkg ..Apr.16
Freight Cars Apr.23	Prices May14	Washers May14
Furnaces, Indus. ...May21	Purchasing Power..June4	Water Heaters Apr.30





Household Electric Ranges
Total Factory Sales—Units

	1951	1950	1949
Jan.	132,437	97,925	109,919
Feb.	123,953	118,989	88,333
Mar.	162,267	145,417	88,934
Apr.	.....	132,859	60,739
May	.....	145,498	52,881
June	.....	158,534	69,107
July	.....	130,505	63,249
Aug.	.....	132,243	66,753
Sept.	.....	156,216	93,045
Oct.	.....	130,452	73,312
Nov.	.....	129,384	60,523
Dec.	.....	124,360	77,011
Total	.....	1,602,382	903,806

National Electrical Mfrs. Assoc.

Radio and Television Output
Thousands of Units

	Radio		Television	
	1951	1950	1951	1950
Jan.	1,203	935	646	439
Feb.	1,313	1,059	679	480
Mar.	1,720	1,349	875	687
Apr.	1,337	1,254	469	543
May	....	1,245	...	486
June	....	1,491	...	502
July	....	666	...	327
Aug.	....	1,304	...	721
Sept.	....	1,335	...	844
Oct.	....	1,230	...	838
Nov.	....	1,216	...	739
Dec.	....	1,506	...	858
Total		14,590	...	7,464

Radio-Television Mfrs. Assoc.

Specialists . . . in Providing Business Capital

Every successful business must specialize in producing certain products, or performing certain services, more efficiently than its competitors. That is why it is successful.

We specialize in corporate financing.

With the experience of more than twenty-five years in our field, we have the financial background to prescribe the kind of external capital needed to expand your business, and the ability to arrange for its procurement on the proper terms.

A friendly discussion with us incurs no obligation of any kind and may easily lead to the solution of your financing problems. If you wish, we shall be glad to give you a list of corporations well known to you, which we have served in this way.

Fulton, Reid & Co.

Originators, Underwriters and Distributors of Corporate and Municipal Securities

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. . . The Swords of Damascus

According to tradition, these keen blades were laboriously hammered at the forge until they resembled the "color of the moon" when quenched. To test the cutting edge, the blade was placed in a slow stream —cutting edge upstream. A piece of silk was floated downstream; if it was severed on contact, the blade was acceptable!

FAMOUS *Blades*

. . . Heppenstall Shear Knives

Made from highest quality steels of our own manufacture, these long-lasting knives have acquired an international reputation. They are a byword wherever hot and cold, ferrous and nonferrous metals are cut or sheared.

Sixty-two years of experience in making better shear knives, the specific heat treatment of electric induction steels for each class of knife offered . . . plus rigid inspection of their chemical, mechanical, and microscopic properties . . . have established Heppenstall E.I.S. Shear Knives as the finest obtainable.

Heppenstall Company, Pittsburgh 1, Pa. Sales offices in principal cities.

Heppenstall — *the most dependable name in forgings*

Men of Industry

R. HERBERT KNAPP
. . . mining chief-coal, U. S. Steel

E. MILTON BARBER
. . . Pittsburgh Steel exec. V. P.

R. Herbert Knapp was appointed chief mining engineer, coal division, **United States Steel Co.,** Pittsburgh. He joined U. S. Steel in 1943 as assistant mining engineer for H. C. Frick Coke Co., Uniontown, Pa. He was appointed mining engineer in 1945 and was promoted to chief engineer of the company in 1947. Since last January he has been chief engineer of the Frick coal division.

K S M Products Inc. appointed **Larry P. English** as chief engineer. He will have headquarters at the main plant in Merchantville, N. J. Before this position he was district engineer for K S M in the New York and New England area.

W. N. Farquhar was named works manager of **Aluminum Co. of America's** new aluminum smelting plant to be built at Wenatchee, Wash.

E. P. Bullard resigns as chairman of the board of directors of **Bullard Co.,** Bridgeport, Conn. He has been named chairman of the board emeritus. **E. P. Bullard III,** who has been vice president in charge of manufacturing, was elected vice president in charge of engineering and development, but resigned May 29.

Dr. W. H. Brandt was appointed manager, special products development division, **Westinghouse Electric Corp.,** Pittsburgh, and **Dr. S. W. Herwald** was appointed engineering manager, same division. **Charles M. Harnish** was made order service manager for the motor and control division, Buffalo, to succeed **J. R. Olnhausen,** who continues as manager of general clerical and office service.

E. Milton Barber was elected executive vice president and director of **Pittsburgh Steel Co.,** Pittsburgh. He was president of Thomas Steel Co., Warren, O., acquisition of which was announced this month by Pittsburgh Steel. Before becoming president of Thomas Steel in 1945, Mr. Barber was vice president of Columbia Steel Co., subsidiary of U. S. Steel Corp.

Officers of the new corporation, **Salem-Brosius Inc.,** Pittsburgh, are: **Ward A. Wickwire,** formerly president of Edgar E. Brosius Co., remains in the same capacity with the new organization, and **Ward A. Wickwire Jr.** becomes executive vice president. Other officers are **Frank E. Myers,** vice president-operations; **H. W. Eddy,** vice president and controller; and **Carl J. Westling,** chief engineer. **Sam Keener,** former president of Salem Engineering Co., has retired from any participation in the management of the merged companies.

Norman W. Rowand was appointed general manager of the Pittsburgh plant of Rockwell Mfg. Co.'s meter and valve division.

Edward N. Case was appointed product supervisor for metal trades product sales in the synthetic organic chemicals department, industrial chemicals division of **American Cyanamid Co.,** New York.

Crawford B. Murton, for the last 27 years works manager of the **Inland Steel Co.,** Chicago Hts. plant, will retire Aug. 1 after 48 years with the company. **William P. Goodman,** general superintendent of the Chicago Hts. plant since 1946, will succeed Mr. Murton as chief operating official without change in title.

Francis G. Jones was appointed sales manager, Gasweld & Welding Supply Division, **Liquid Carbonic Corp.,** Chicago.

B. C. Adams Jr. was elected vice president, **Texas Gas Transmission Corp.,** New York, in the gas supply department. **Edward T. Bowers** was elected comptroller of the corporation.

Avondale Marine Ways Inc., Westwego, La., purchased all outstanding stock in **Service Foundry Inc.,** New Orleans. At a meeting held in the Service Foundry offices, these officers were appointed: **J. H. Bull,** chairman of the board, president and general manager; **H. G. Koch,** vice president and a director; **James Viavant,** secretary-treasurer and a director; **Hettie Dawes,** comptroller and a director; **Henry Z. Carter,** assistant general manager and a director; and **Ben Peters,** plant manager.

Harry A. Dennis was appointed assistant sales manager for **Graver Tank & Mfg. Co. Inc.,** E. Chicago, Ind. He has been with the company for more than two years, first as manager of sales, weldment division, and then in the same position with the alloy division as well.

A. J. Bedworth was named chief assistant to O. E. Johnson, **Kaiser-Frazer Corp.** general planning superintendent, aircraft division, Willow Run, Mich.

John C. Wallace, formerly special projects development engineer with Baldwin-Lima-Hamilton Corp., was appointed chief engineer for the newly created diesel engine parts research and development division, **Hunt-Spiller Mfg. Corp.,** Boston.

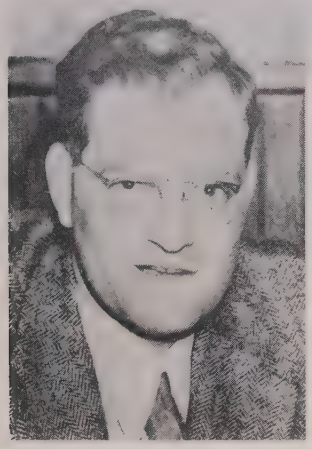
New appointments by **Chiksan Co.,** Brea, Calif., include: **N. A. Guill,** division manager, Chicago branch office, and sales supervisor of the Chicago district; **W. L. Clark,** sales representative, Chicago territory, to assist Mr. Guill.

Frank H. Bishop, a vice president of **Allied Products Corp.,** Detroit, was elected executive vice president.

Kirk C. Mattson joined **Pennsylvania**

Salt Mfg. Co. as district sales manager of the Los Angeles office.

S. J. Merhenhagen was appointed sales manager, forged products division, **American Forge & Mfg. Co.,**



S. J. MERGENHAGEN
. . . div. sales mgr., American Forge & Mfg.

Pittsburgh. For the last two years he was assistant sales manager of Heppenstall Co., and for three years prior to that was manager of its district office in Philadelphia.

Arvid W. Hamrick, a senior field engineer for Signode Steel Strapping Co., has resigned his position to take an appointment with the Commerce Department in Washington, as chief of the steel strapping unit, container and packaging division, chemicals, rubber and forest products bureau, **National Production Authority.**

Bert W. Reynolds was appointed manager of **General Electric Supply Corp.'s** Oakland, Calif., facilities, succeeding **E. W. Garcia,** who will retire July 1 after 41 years of service with the company.

Bell Aircraft Corp., Buffalo, appointed **Roy H. Coleman** as manager of manufacturing for its new helicopter division, Ft. Worth, Tex., plant.

William E. Roberts was named vice president in charge of operations, **Bell & Howell Co.,** Rochester, N. Y.

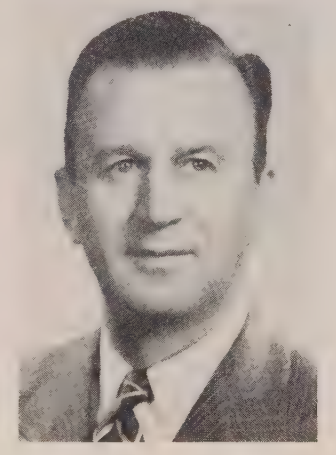
Caine Steel Co., Chicago, appointed **William S. Harms** its representative in the Missouri territory, and **William P. Sullivan,** representative in the Wisconsin territory.

Howard Elliott and **Frank J. Scanlan** were appointed district sales representatives for **Star-Kimble Motor Division,** Miehle Printing Press & Mfg. Co., Bloomfield, N. J. Mr. Elliott will cover Long Island, Staten Island and Brooklyn. Mr. Scanlan will cover northern New Jersey.

Baldwin-Lima-Hamilton Corp., Philadelphia, elected the following members to the executive committee: **Edward Hopkinson Jr.,** chairman, **Charles E. Brinley, Joseph N. Ewing, Gwilym A. Price, William W. Prince, George A. Rentschler, John J. Rowe** and **Marvin W. Smith.**

Russell J. Cameron, former vice president-sales, was elected president of **Ross Operating Valve Co.,** Detroit. He succeeds **John Sainsbury,** who remains as an active consultant and member of the board of directors. **W. E. Hennells** was named vice president, and **L. M. Blomgren,** secretary and treasurer.

American Safety Razor Corp., Brook-



EDGAR A. NELSON
. . . V. P.-production, American Safety Razor

lyn, N. Y., appointed **Edgar A. Nelson** vice president in charge of production. He was a manufacturing executive in the razor blade industry for the last 20 years, and was appointed plant manager of American Safety Razor Corp. in 1942.

Dr. George J. Goepfert was appointed director of research for **Speer Carbon Co.,** St. Marys, Pa., and its subsidiary, **International Graphite & Electrode Corp.** He was supervising engineer, organic chemical laboratory, research and development division, Carborundum Co.

Allied Metal Specialties Inc., Baltimore, appointed **Charles H. Weber Jr.** as sales engineer for New England.

In the metal products division, **Koppers Co. Inc.,** Baltimore, **Nicholas Kay** was made manager of the production department, and **Thurman F. Naylor** manager of the contracting department.

Appointment of **C. W. Powell** as Pittsburgh branch manager was announced by **Carboloy Co. Inc.**

Walter C. Bladin was appointed assistant to the vice president of **Burnside Steel Foundry Co.,** Chicago.

Russell E. Starbard was appointed a buyer in the purchasing department of **Norton Co.,** Worcester, Mass., replacing **Robert F. Kirkpatrick,** recalled into service by the Air Force. **Elmer B. Jones** retired May 1 as general traffic manager, but is retained as traffic consultant. **Curtis M. Clark** of the legal department was made counsel.

A. M. Katz was elected chairman of the board of **Ideal Plastics Corp.,** Hollis, L. I., N. Y.

E. E. Howe was named director of research, **Chicago Vitreous Enamel Product Co.,** Cicero, Ill. **B. T. Sweely,** vice president in charge of research, resigned May 31, but is available as a consultant.

Mills N. Ripley was appointed New York regional manager of **Lamson Corp.,** Syracuse, N. Y. He heads the New York, Philadelphia and Baltimore districts. Concurrent with Mr. Ripley's appointment the New York office is moving to larger quarters at 295 Madison Ave., New York 17.

Henry Kleifgen was elected president of **Admiral Die Casting Corp.,** Chi-

HENRY KLEIFGEN
. . . heads Admiral Die Casting Corp.

cago, recently organized. The company announces completion of its modern plant at 200 W. 83rd St. Mr. Kleifgen formerly was production

manager of Central Die Casting & Mfg. Co. Inc., Chicago.

K. S. Watson was appointed co-ordinator of industrial waste treatment for **General Electric Co.,** Schenectady, N. Y. Named to posts in the aeronautic and ordnance systems divisions are: **J. W. Whiteside,** manager of production; **H. F. Dickie,** superintendent, Schenectady aeronautic and ordnance manufacturing division; and **K. K. Bowman,** assistant to manager of manufacturing.

L. F. Manneschmidt was appointed manager, used trailer department, **Trailmobile Co.,** Cincinnati.

William E. Hoard was appointed manager of the new **Western Gear Works** plant at Belmont, Calif. **Ray Conlisk** was promoted to supervisor of the application engineering department at Pacific Gear & Tool Works, affiliated plant at San Francisco.

Frank F. Dicker was named president of **Supreme Tool & Mfg. Co.,** Milwaukee, formerly known as Supreme Die & Tool Co. The firm previously was owned by **Eric Singer,** who is vice president of the newly incorporated company. **H. W. Townsend** is secretary. The three share ownership.

William F. Lucas was appointed assistant to E. H. Ehlert, western region manager of **Detrex Corp.** Mr. Lucas will have headquarters in the Chicago office.

John S. Morris was appointed supervisor of construction, centralized maintenance department, **Lukens Steel Co.,** Coatesville, Pa.

William Schweizer has rejoined **Schweizer Aircraft Corp.,** Elmira, N. Y., as vice president in charge of manufacturing.

V. J. WESTERFIELD
. . . plant mgr. of Liberty Mfg.

V. J. Westerfield joined **Liberty Mfg. Co.,** Santa Monica, Calif., as plant manager. He was employed for 20 years as plant engineer with Truscon Steel Fabricating Division, Republic Steel Corp., Cleveland, and in 1945 was on loan to Consolidated Vultee Aircraft Co. in Allentown, Pa., by Republic as a superintendent of the plant. In 1946 he was transferred to Hall-Scott Motor Division of A. C. F. Brill Co., Berkeley, Calif., as works manager. In 1950 Mr. Westerfield became assistant factory manager of Norris Stamping & Mfg. Co., Los Angeles.

Donald E. Springer was appointed assistant chief engineer, **Hooker Electrochemical Co.,** Niagara Falls, N. Y.

Robert G. Stacy was made head of railway disk brake sales for **Budd Co.,** Philadelphia. He will have headquarters in Chicago. **Henry F. Blankenbiller** was made manager of the railway service department to succeed **Clyde C. Elmes,** retired.

Robert L. Gibbs was appointed manager of sales personnel, **Mueller Brass Co.,** Port Huron, Mich. He formerly was head of the sales promotion and advertising division, and is succeedeed by **E. A. Fairchild.**

Arthur J. Frank was appointed assistant to L. B. McKnight, executive vice president of **Chain Belt Co.,** Chicago. Mr. Frank continues as trade analyst and co-ordinator of defense mobilization.

Thomas J. Hanley, service and erection engineer for the past nine years for **Allis-Chalmers Mfg. Co.,** Milwaukee, was promoted to supervisor of electrical and hydraulic turbine service and erection. He succeeds **D. J. Goodsole.**

N. Martin Steffens was promoted to assistant to the president of **Geuder, Paeschke & Frey Co.,** Milwaukee. He has been manager, planning and production.

Extruders Inc., Culver City, Calif., appointed **Robert C. Raab,** manager, aircraft products division, to direct national sales of electrical insulation tubing, custom extrusions, and aircraft electrical wire. He was formerly account executive with General Cable Corp.

Victor O. Ray was named Pacific Coast district engineering representative, aircraft department, **Westinghouse Electric Corp.,** headquartered at San Francisco.

Richard L. Gray was appointed assistant to the president of **Nesco Inc.,** Chicago.

W. D. Dickie was made works manager of **Canadian Pacific Railway's** Angus Shops at Montreal to succeed **Henry R. Naylor,** retired.

OBITUARIES . . .

Howard H. Bristol, 63, chairman of the board of **Bristol Co.,** Waterbury, Conn., and president of that company since 1930, died June 2 after a brief illness.

Robert B. Wasson, 73, retired consulting engineer at Linden, N. J., for **General Motors Corp.,** and inventor of the Wasson piston ring, died May 29.

Clarence J. Lemont, 62, a retired vice president of **Line Material Co.,** Milwaukee, died June 1. He was vice president of manufacturing when he retired in 1948.

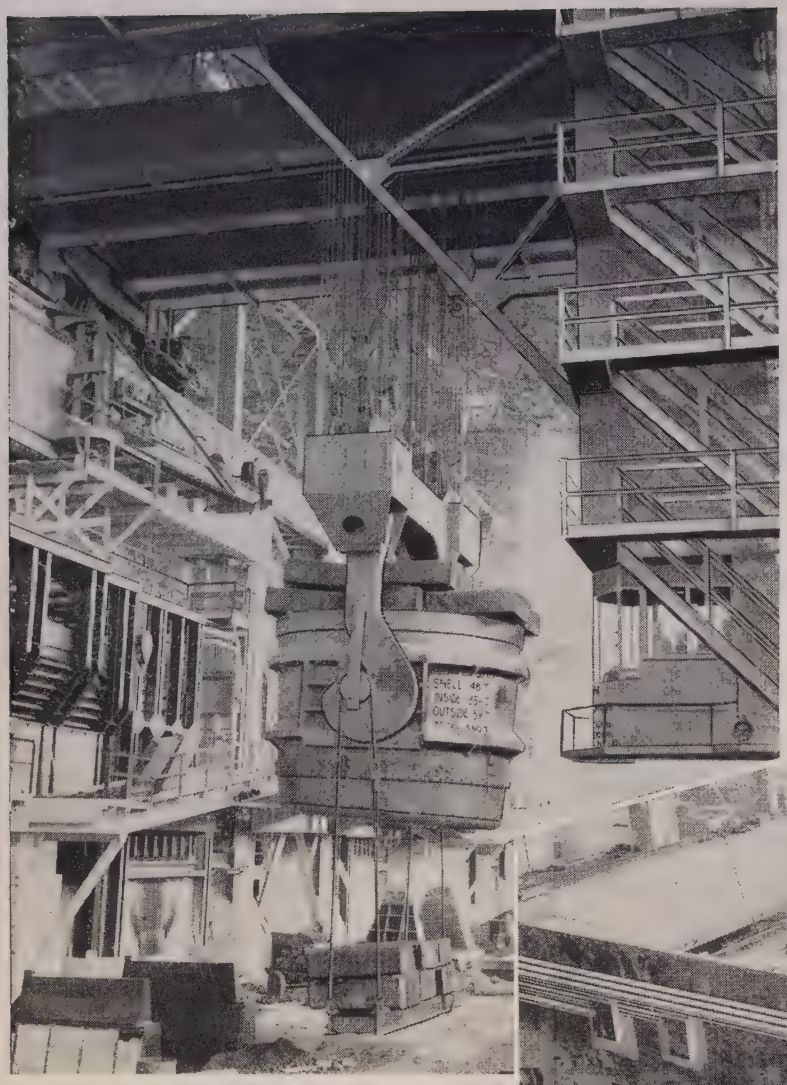
George A. Dobbie, 71, a former president of **Canadian Brass Co. Ltd.** and vice president of Slingsby Mfg. Co. and Cockshutt Plow Co., died May 24 in Galt, Ont., Canada.

Arthur F. Southwick, 58, purchasing agent for **Union Iron Works,** Erie, Pa., died May 25 after a long illness.

George E. Palmer, 55, owner of **Universal Gear Corp. of Indianapolis,** died May 30 at his home near Danville, Ind.

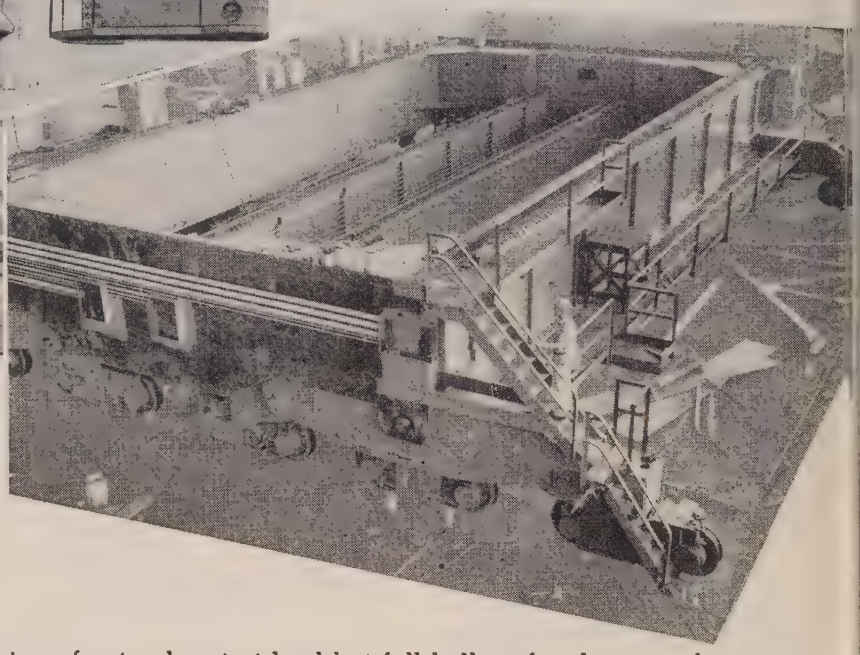
George B. Stoess, 38, assistant sales manager, wire rope division, **John A. Roebling's Sons Co.,** Trenton, N. J., and **Vincent L. Daulton,** 47, Philadelphia district sales manager, were killed in a train wreck at Bryn Mawr, Pa., May 18. They were returning from a coal mining convention in Cleveland.

Ivan S. Corcoran, 63, sales manager of the regulator department of **Square D Co.,** Milwaukee, died May 31.



New 300-Ton Ladle Crane with EC&M CONTROL

Successfully handles test load of 460 tons



(At right) View of 300-Ton Ladle Crane during assembly on erection floor of Morgan Engineering Co., Alliance, Ohio

Safe raising and lowering of not only a test load but full ladles of molten metal is a prime requisite of ladle crane control. EC&M's Wright Circuit for crane-hoists is simplified, safe—and provides the operator with direct control (from the Master switch) of all loads in the lowering direction.

Note the width of this ladle crane. Six motors (3 on a side) are operated as 3 pairs of 2 motors in parallel to drive the bridge motion. EC&M Duplex Controllers help insure that the pairs of motors divide the load between each other. Current peaks during starting, accelerating, plugging and re-acceleration are accurately matched in each motor circuit by this EC&M Control Method.

When buying cranes, specify EC&M Control.

THE ELECTRIC CONTROLLER & MFG. CO.

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Production and Engineering
NEWS AT A GLANCE

COUNTERBLOW HAMMERS COMING— Success and popularity of the counterblow forging hammer in Germany is indicated by figures showing around 350 of them were installed there in the period 1932 to 1941, and probably another 350 by the end of the war. They ranged up to 290,000 ft lb in capacity, roughly the equivalent of a 34,000-pound steam hammer, all with mechanical coupling between upper and lower dies. Development of a hydraulic coupling arrangement has facilitated the design of still larger counterblow units which Hydropress Inc. is going to build in this country. They point to a major step ahead in heavy forging practice.

MILLIONS FOR ONE MODEL— Putting a new postwar passenger car model into production at the plants of one medium-size company called for the purchase and installation of 164 new machines, movement of 979 machines and presses to new locations, design and construction of 1650 new dies and 805 fixtures for the body plant, purchase of 2615 new tools for the assembly plant, and installation of 13½ miles of conveyor track. The job was a two-year effort, the cost $16 million.

SCRAP COST IS HIGH— Capsule summary of the results of instituting quality control in the finish grinding of piston rings shows this: Before control scrap was 3.82 per cent; after control limits were properly established it dropped to 0.42 per cent. Cost of scrap at this stage was estimated at $1000 a per cent per month. Cost of grinding before control was $1.52 per 1000, after 0.31-cent per 1000. Inspectors before control numbered 28, after two.

VERSATILITY IN GUNS—One of the most promising new weapons for both aerial armament and use by ground forces against enemy air is a .60-caliber machine gun which hits harder and fires faster than the "old reliable" .50-caliber, and has the novel feature of a barrel and chamber which can be unscrewed and replaced in one minute and without tools by a 20-mm barrel and chamber where a more powerful shell is desired. The gun can be set up in position and fired by remote control from a considerable distance. It was developed during World War II primarily for airplane installation, has been much improved since and has seen service in Korea.

ARMOR-PIERCING PROJECTILES—Steel projectiles with cemented carbide cores appear worthy of more serious consideration in large-caliber ordnance. High-density carbide-cored projectiles at striking velocities in the upper brackets above 3800 feet per second can penetrate with ease high-proof homogeneous armor plate at 42-45 Rockwell C of a thickness approximately five to six times their caliber. Thus a .50-caliber projectile of this type and at the indicated velocity could penetrate armor up to 3 inches in thickness.

PUNCH FOR THE NAVY— Focal point for design and development of new navy weapons is the Naval Gun Factory in Washington, now past the century-and-a-half mark and boasting 188 buildings on one site, covering a complete range of metal processing, fabrication and inspection. From them come naval weapons for use in the air, on the water and under it—all designed to be translated readily into volume production by navy contractors. —p. 79

MOVING AT A PROFIT— Incentive pay systems are not ordinarily associated with materials handling, but one large manufacturer of cranes and shovels, after two years of study, has found them paying off to the tune of a 25 per cent increase in production and 62 per cent reduction in manpower. Along with the wage premiums has come rearrangement of handling facilities to expedite the flow of parts and subassemblies. —p. 82

SUCCESS IN DIRECT REDUCTION—Sponge iron reduced from high-grade ore in a brick kiln seems to have emergency possibilities as a supplement for scrap in the production of electric steel, on the basis of extended investigations by Canadian researchers. They have recommended refinements in the design of "saggers" used in the familiar Swedish Hoganas direct reduction process for the past 40 years. Pilot runs in Canada show economical reduction of a variety of ores, with yields of around 25 tons per day per kiln indicated and cycle time cut down to 36 hours. —p. 92

AND IN CONCLUSION: "If an all-out war is to avoided, the free world must increase its supply of metals and use efficiently both the new metal production and all of the practically available scrap," says Dr. Zay Jeffries (p. 76), in his first statement as director-general of the forthcoming World Metallurgical Congress . . . New type of air conditioning duct is circular in cross section, spirally wound in a special machine from flat galvanized strip. Space requirements and installation cost are well below those for conventional rectangular duct . . . Keep a closer eye on your tool steel scrap (p. 101) and see that it is segregated properly into the four basic types and the two forms, solids and turnings. —A.H.A.

Metalworking Outlook—p. 39 *Market Outlook—p. 143*

By A. H. ALLEN
Associate Editor, STEEL

First Exploratory Effort in

Technologists, scientists, production executives and sales engineers in producing and fabricating industries will join in global conference to examine conservation, utilization and substitution of strategic metals; to share scientific knowledge, technical and business skills

SUPREMACY in the field of metals may be one requirement for survival of a free world as it is known today, and such power may be more the collective brains of research, scientific and fabricating skill than it is the simple facts of resources, territorial expanse or plant capacity. A comprehensive view of world metallurgical trends post-World War II is obscured by the inevitably slow rebirth of technical progress in devastated areas, by nationalistic insulations, by the forcible dislocation of former centers of world knowledge coming in the aftermath of war, and by basic and unfortunately widening cleavages in world thinking on sociological problems.

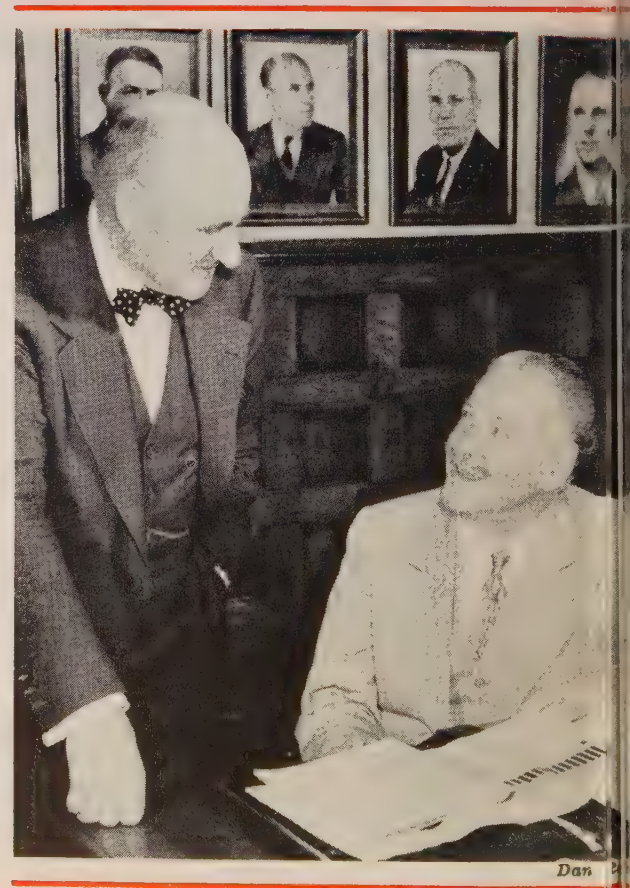
There must arise two viewpoints—one the short-range concerned with the common defense of free nations against an enemy whose aggressive intentions are at least feared; the other the long-range where more intelligent production and application of metals can open the way to increased world trade with its desirable by-products of a higher standard of living, more jobs, more and better things for more people, to use an overworked though apt phrase.

Knowledge Is Global—With a substantial edge on all countries in production and utilization of basic metals—iron, steel, aluminum and copper—the U. S. still has no corner on metallurgical acumen. For example, techniques like cold extrusion of steel shell and cartridge cases were common in Germany ten years ago where pressure for steel conservation made their adoption imperative. In Britain metallurgical knowledge of high-temperature alloys for jet engines and gas turbines was considerably advanced from the U. S. level, although in recent years the gap has been narrowing.

In France, the OTUA (Technical Bureau for the Utilization of Steel) has been functioning since 1928, supplying through lectures, films, handbooks and publications the latest technical information calculated to promote the use of ferrous metal products in that country and its colonies. And in Japan, from the ashes of war a new bulwark of metallurgical experts is being groomed at its seven national universities, notably Tohoku at Sendai. The veteran Kotaro Honda has long been an important Japanese contributor to the world's metallurgical literature.

There has never been an assemblage of metallurgical leaders on a worldwide scale for the purpose of co-ordinating thinking and exchanging results of research findings. Such a thing was just too big and complicated for anyone to undertake. The vision of what it might accomplish was lacking. However, it has been a dream in the active mind of W. H. Eisenman, secretary of the American Society for Metals, who has been master-minding annual national metals congresses and exhibitions for 30 years. This fall, his international thinking will become a reality, in the form of a World Metallurgical Congress, scheduled for Detroit, Oct. 15-19. It will be a crowning achievement in a brilliant career of furthering knowledge among the metallurgical fraternity.

Laying the Groundwork—In working out the mechanics of a world gathering of technical men, it was necessary first to select a leader whose experience and



Dean of U.S. metallurgists, Dr. Zay Jeffries (left) checks with dean of U.S. technical society managers, W. H. "Bill" Eisenman, on plans for cross-fertilization of ideas among world's top metallurgists. Looking on from the wall are four eminent metallurgists in their own right—A. L. Boegehold, Francis B. Foley, Harold K. Work and A. E. Focke, successive past presidents of the American Society for Metals, 1947-1950

World Metallurgy

background would guarantee recognition and support from the participants; then to devise a specific program which could be implemented well in advance. No better choice for the job of director-general could be imagined than Dr. Zay Jeffries, whose work as educator, author, metallurgical consultant and administrator is known everywhere that metals experts converge.

The 63-year old dean of U. S. metallurgy, as many like to call him, in early years taught at Case Institute of Technology, and carried on consulting work for the former National Lamp Works of General Electric in Cleveland, the research bureau of Aluminum Co. of America, and National Tube Co. During the first World War he served with the committee on metallurgy of the National Research Council and contributed importantly to the development of aluminum castings for the Liberty engine. He is an authority on tungsten lamp filaments, high-strength aluminum alloys and x-ray crystal analysis.

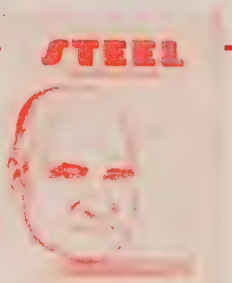
Always close to the inner workings of the American Society for Metals and its predecessor, the American Society for Steel Treating, he was treasurer of the latter organization from 1923 to 1927, then becoming vice president and in 1929 president.

From 1932 to 1936 he was president of the GE-affiliated Carboloy Co., later becoming chairman of the board, and finally transferring to the lamp department of General Electric where he served as technical director. The second great war saw him active as vice chairman of the War Metallurgy Committee, and in 1944 he was named vice president in charge of the new GE chemical department at Pittsfield, Mass. In 1946 the company named him a member of its four-man nucleonics committee to administer widely scattered research in the field of atomic energy. Retiring at the close of 1949, he found little time to relax, for the defense emergency immediately drew him into the 14-man Metallurgical Advisory Board where he now heads activity on critical and strategic materials and substitutes. In the former category are cobalt, columbium, tantalum, titanium, molybdenum, tungsten and beryllium; with all of them he has had considerable experience.

Dr. Jeffries, quiet, friendly, unprepossessing, talks guardedly on the world outlook for metals. His attention is occupied with so many "classified" subjects and he must strive to avoid making public statements which might prove contentious. At STEEL's request, however, he did prepare the observations presented below.

Country-wide Tours Mapped—So WMC's direction is in stout hands. What of the program itself? It was only natural, of course, in mapping out a metallurgical congress that the assistance of the Economic Cooperation Administration be sought, because of its close ties with industrial activity in the Marshall Plan countries which have been receiving ECA financial

(*Please turn to Page* 104)



Says Dr. Zay Jeffries:

"THE PRESENT world crisis will be resolved dramatically if there is an all-out 'hot war' or it will evolve gradually toward a livable peace. If there is to be a large-scale war, metals, as in the past, will play a major role in the outcome. If an all-out war is to be avoided, the free world must increase its supply of metals and use efficiently both the new metal production and all of the practically available scrap. This could so enhance the potential military power of the free peoples that an aggressive attack by Russia would be virtual suicide.

"The production mobilizers in the free world have been and are implementing plans to increase the metal supply. In tonnages the most important increases will be in steel and aluminum, but no metal needed in our complex economy is being neglected.

"Many groups are essential in making optimum use of these metals, including managers, designers of end products, allocators, inventors, transportation teams, production teams, etc., but one group that must be counted on for efficient utilization is the metallurgists.

"Fortunately, metallurgical art and science in the free world are in good health. This is one result of freedom's fertile soil for the growth of 'collective genius'. Just as a group advances an art or science faster than an individual, so do many groups working along the same line progress faster than one group. By exchanging the results of experience and experiment, by discussing theories, and by the cross-fertilization of ideas, the collective genius completely eclipses the individual genius no matter how great may be his stature. The individual genius does not become less important in this scheme of information and idea dissemination; rather his contributions become more important to society when he participates in group effort.

"I feel that the World Metallurgical Congress, to be held in Detroit in October, will provide an opportunity to further the collective genius benefits in metallurgy in the whole free world and bring nearer to realization that cherished goal of decent people on this earth—peace with freedom."

By GUY HUBBARD
Machine Tool Editor

35 YEARS OF AGMA: Last week I attended the 35th annual meeting of American Gear Manufacturers Association at Hot Springs, Va. I found that on the occasion of arriving at this milestone in the life of the "engineering body of the gearing industry", considerable reminiscing was being done by the older members as to the founding and subsequent achievements of this organization.

Its first annual meeting was held at the Laurel House, Lakewood, N. J., in March, 1917. Then—as now—we were involved in a war which was yet to be declared as far as the United States was concerned.

Experience throughout two world wars since that distant day have conditioned us to the rigors of all-out war production. If all-out war does develop this time, industry as a whole—and the gearing industry in particular—is far better prepared both engineering-wise and business-wise to meet the emergency. In the case of the gearing industry this desirable state of preparedness is to no small degree due to the standardization projects and the pooling of technical, production and managerial know-how fostered by AGMA throughout the past 35 years.

AGMA—like other engineering and business associations here in America—always has been "geared" primarily to improvement of peacetime mechanisms and peacetime industrial methods and industrial relations. Its members don't like war and they don't want war. However, if and when war comes they always can be counted on to be several jumps ahead of certain foreign industrialists whose activities primarily are designed to implement aggression.

STANDARD UNITS—SPECIAL MACHINES: At the present stage of the defense production effort there is a tendency to tie up too many scarce standard machine tools on routine production work which actually can be done much faster and with fewer and less skilled operators on special machines.

This term "special machines" may conjure up in the minds of many readers visions of huge, complicated, expensive and hard-to-get station-to-station type wonders which appeared in aircraft plants during World War II. These machines had their place—and they will again. However, there is an opportunity now for a great many more—and much more simple—special machines which can be assembled quickly and cheaply from ready-made units.

These ready-made units include the so-called light duty drill presses, spindle units of such drill presses, and various self-driven and self-fed combined spindle and feed units which now are available from companies which manufacture them under mass production conditions. Incidentally, many of them are manufactured by builders of medium and heavy duty machine tools who recognize the importance of such units in freeing the larger machines for the kind of work which only they can do.

Special machines assembled from these light-duty units make no pretense of being objects of beauty—streamlining being sacrificed to strict utility. I have just been studying the design of such a special machine which drills 16 holes simultaneously in aluminum gas tanks. The 16 self-powered, self-feeding drilling units stick out like porcupine quills from a semicircular fixture surrounding the workpiece.

This fixture is split so that it can be opened by air cylinders to allow the work to be set in place. One man operates it and accomplishes as much work as formerly was done by four men running conventional drilling machines. The frame of this special machine is a simple affair of structural steel. If the work ever is given up, it can be scrapped at small loss. The drilling units then can be used one or severally for some other equally useful purpose.

The possibilities for similar assemblies are endless—being limited only by the ingenuity of the tool engineers who design them around work to be done.

INDUSTRIAL MIGRATION: All the talk heard within recent years about America having no more frontiers, is belied by a rising tide of industrial migration accentuated by revival of defense production. Not only are World War II facilities—many of them far removed from traditonal industrial centers—being reactivated, but many new ones, also on our industrial frontiers, are being established.

Critical though the material and equipment situation is, these establishments—many of them of huge size—rapidly are being made ready for action in the physical sense. Whether they will be as successful in obtaining manpower as they have been in obtaining material and machines, is another question. Judging from the amount of display advertising being done in eastern and midwestern industrial centers where skilled men and women already are at a premium, the staffing of these plants in distant places poses some real problems.

In this day and age of the automobile and the house trailer, industrial workers not only have developed mobility but also have developed a mass urge to live and work in new surroundings and friendlier climates. Much of the current advertising for help has these themes woven through it. In other words, it tempts the older, settled craftsmen to renew their youth by again becoming journeymen.

Whether this kind of thing eventually will result in establishment of manpower controls is a matter for serious thought. If the drainage becomes great enough to seriously cripple eastern and midwestern industrial activities, controls undoubtedly will come. If on the other hand, only enough skilled people are drained off to serve as trainers of local unskilled workers under the highly effective quick training systems now available, the migration will not be serious enough to give an excuse for government control. Therefore, no efforts should be spared to refurbish and re-establish the quick training methods which demonstrated their effectiveness throughout World War II.

Breeding Ground for Navy's Firepower

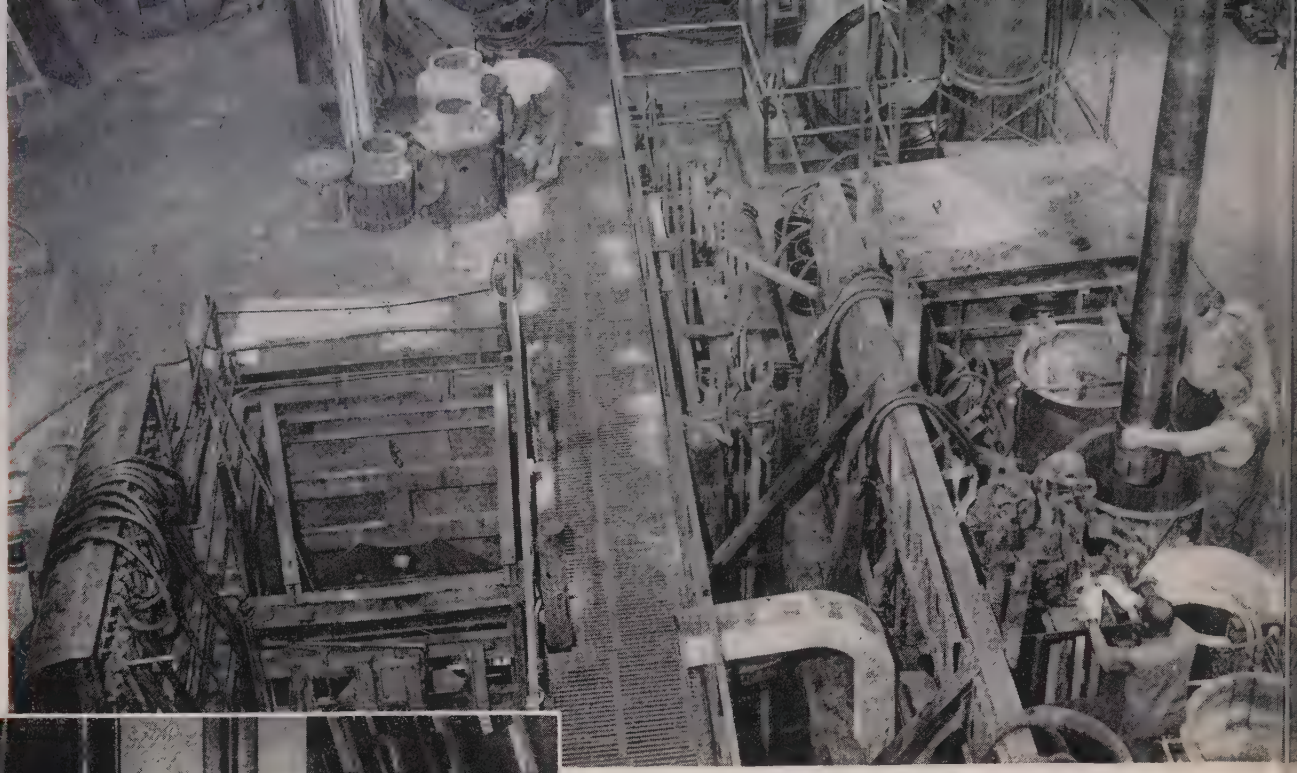
Naval Gun Factory, fully integrated for all types of metal processing, provides core of technical skill to aid private contractors in rearmament periods

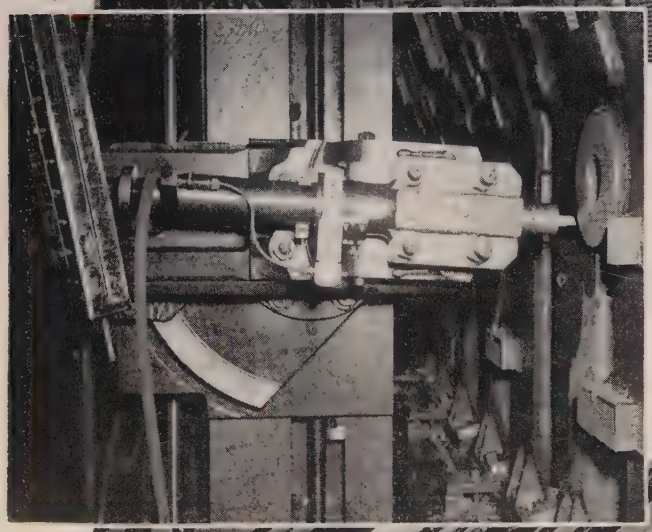
THINGS are looking up again at the 152-year old Naval Gun Factory along the Anacostia river in Washington, D. C. They always do when there is the tension of war or preparedness in the air, and the present emergency is no exception. Prior to 1945, the facilities were known as the Washington Navy Yard and while the new name may be more appropriate it hardly connotes the largest naval armament plant in the world, comprising 188 buildings sprawling over 125 acres.

The "mission" of the factory is to design, develop, manufacture, assemble, inspect and test ordnance equipment, including guns and mounts of all calibers and types, aviation ordnance, torpedo tubes, rocket launchers, projectiles, fire control equipment, optical devices, cartridge cases, spare parts, tools and accessories and other naval materiel as directed by the Department of the Navy's Bureau of Ordnance. It also serves as a source of prototypes of new weapons; overhauls, maintains and stores ordnance materiel; operates the naval ordnance gage laboratory, and administers the final acceptance gage program.

Beyond that, the NGF provides technical consultation service on ordnance to private industry and maintains laboratory facilities for examination, development, test and standardization of materials and techniques for ordnance purposes. Actually it represents a continuing "hard core" of technical research and skill in the building of the navy's firepower,

Inspecting the bore of a 16-inch gun liner, preparatory to rifling. In the left foreground is the pack bit ready to start the rifling operation

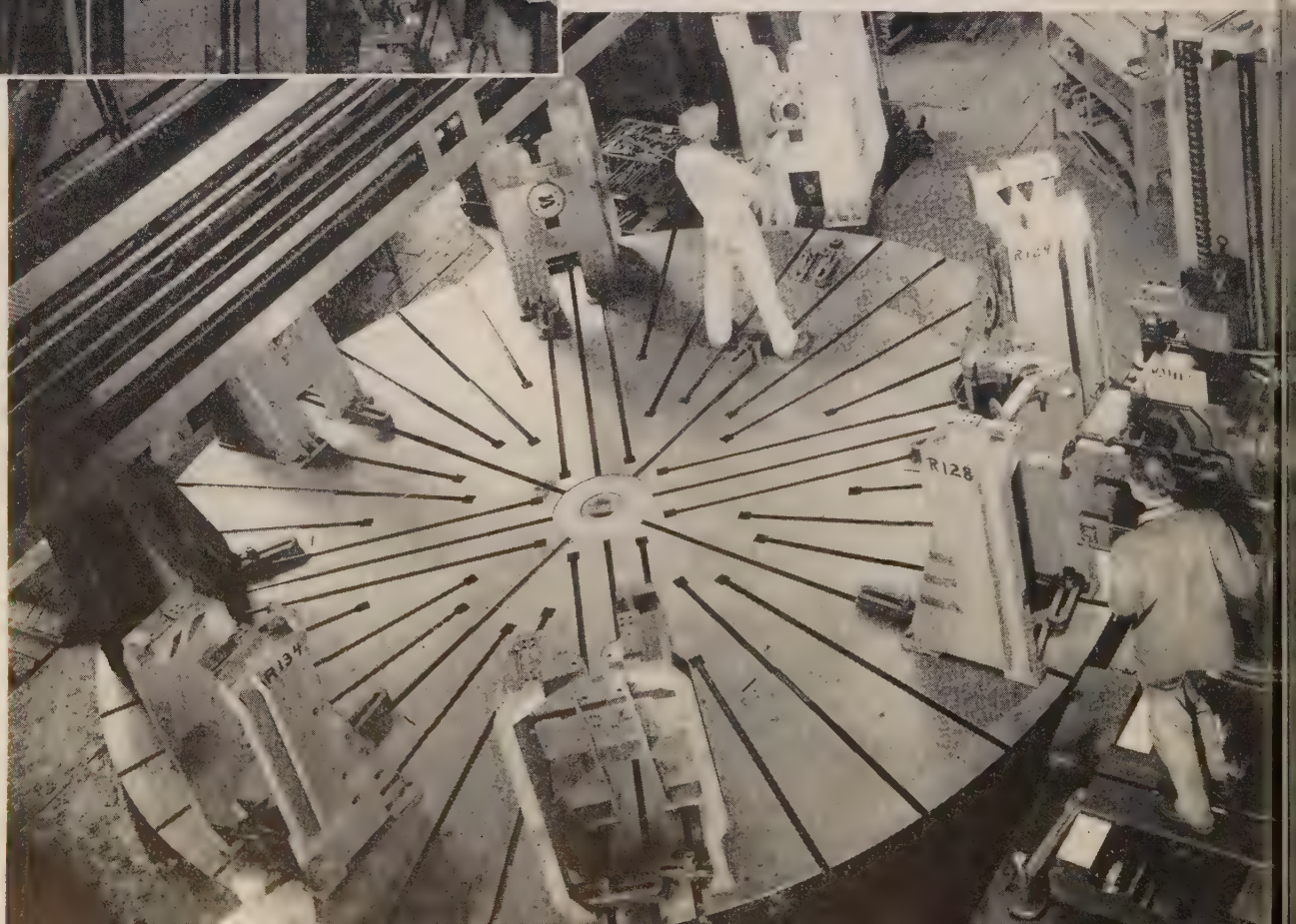




Above—Hard chrome plating is standard on bores of all major caliber barrels, requiring deep pits for both cleaning and plating treatments

Left—Navy-designed step cutting and hurdling head which planes surfaces at nine different heights in a single stroke across a large gun carriage

Below—Machining angular clearances on these eight gun carriages is accomplished by mounting them on a 25-foot boring mill table and positioning a "portable" milling machine as shown at the right



facilitating the rapid expansion of manufacturing effort when the heat is on.

Precision, Speed, Practicability—There are four guiding principles adhered to by the factory's production engineering division: Produce parts to exacting engineering requirements; do the work in as few setups as possible; save time on each operation; and make the result practical for a private contractor if an emergency requires the speedy placement of large orders.

Organizationwise, the NGF now breaks down into 11 co-ordinated departments devoted to management planning and review, industrial relations, fiscal, administrative, public works, medical, planning, engineering, supply, production and inspection. The largest naturally is the production division, comprising 21 shops grouped under three headings—metal processing, light machining and assembly, and heavy machining and assembly. The metal processing section includes a foundry for both ferrous and nonferrous work, plus pattern and joiner, forge, cartridge case, boilermaker, gunners work, plating and polishing, sheet metal and mine case shops. The second section covers tool, optical, assembly and fuze sight and torpedo tube shops, while the third lists gun carriage and repair, gun, breech mechanism, aircraft armament, erecting and broadside mount shops.

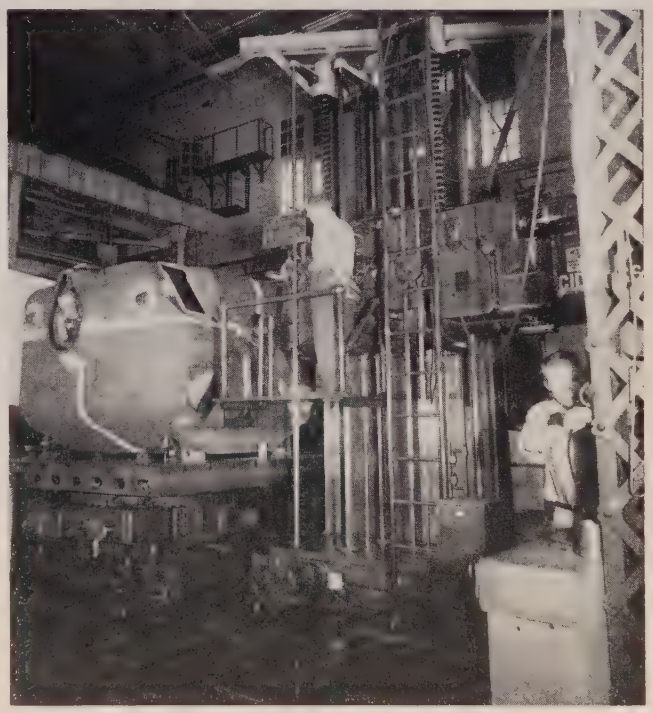
Because the factory is practically self-sustaining, or fully integrated from a manufacturing standpoint, it is capable of expediting rush jobs and undertaking new and difficult tasks with little interruption to a normal flow and volume of production. Many of its shops design and manufacture their own tools, jigs and fixtures for new projects as well as for routine orders. A recent example was an urgent order for fuze plugs requiring the manufacture and installation of circular cutters for automatics.

Handling the Big Stuff—A few illustrative highlights of equipment scattered throughout the NGF shops are presented herewith, representative of some of the metal processing activities. In the gun barrel plating section, for example, bores of all major caliber barrels from 3 to 16 inches are hard chromium plated, such specifications having originated in 1933. Larger calibers require deep pits, because of the barrel lengths, so there have been installed two plating pits 60 feet deep and one 75 feet deep. Nearby are four cleaning tanks (illustrated) 36 inches in diameter and ranging from 10 to 27 feet in depth.

Cleaning the bores of these large barrels before plating is interesting. The barrel is lowered into a pit, its breech end resting on a sealing gasket, permitting the bore to be filled with cleaner solution. A steam coil then is inserted in the solution, heating it to around 200° F for an hour. The solution then is drained and the bore scoured with cleaner solution and powdered pumice. Next it is rinsed and again scoured with a 10 per cent sulphuric acid solution and pumice. After a thorough rinse, several gallons of chromic acid are poured through the gun to protect the cleaned surface until the bore is filled with plating solution.

Scouring is done with a special mop comprising several sections of wire brush wheels mounted on the end of a pipe shaft long enough to reach through the gun. The wheel sections are slightly larger than the bore so that the wire bristles will reach the bottom of rifling grooves. The wheels are covered with several layers of burlap saturated with cleaner or acid and lowered and raised through the bore by an overhead crane.

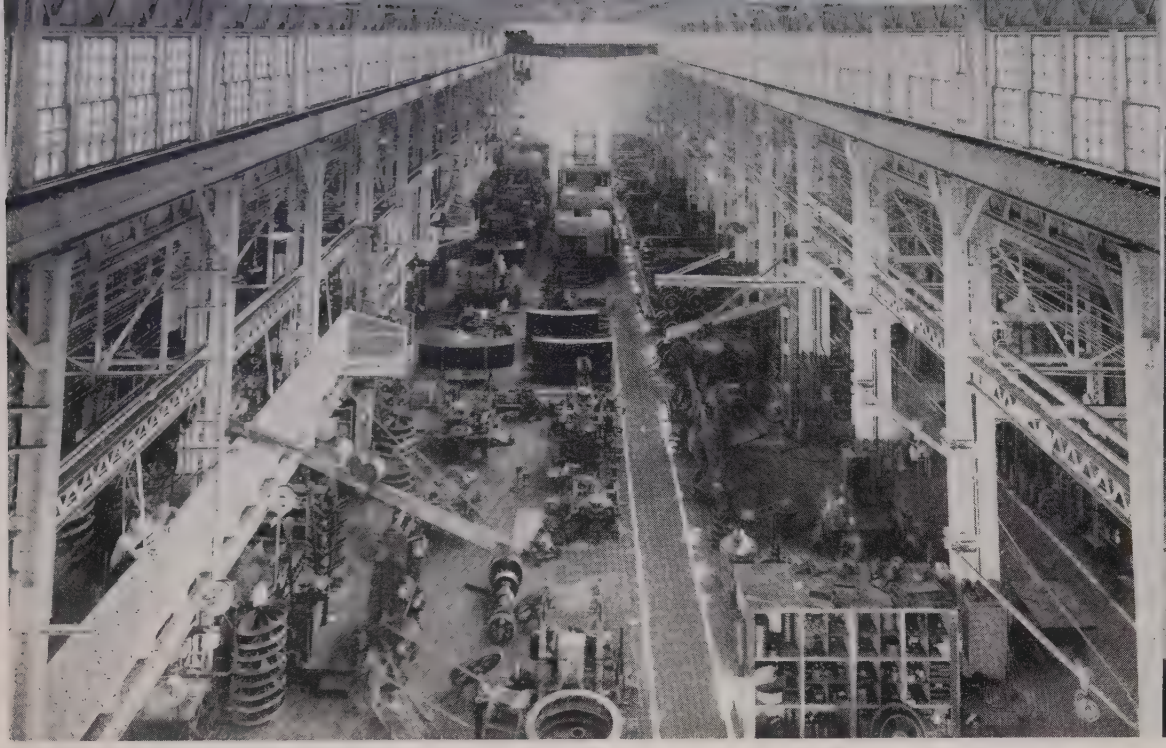
Mother of the numerous machine shops operated at the NGF and a direct offspring of the first machine shop of the old Navy Yard presently is known as the gun carriage and repair shop. Here for many years has been done all the machining of larger types of gun mounts such as 12, 14 and 16-inch. Equipment naturally is heavy-duty, diversified, specialized and spread out over five contiguous buildings. An inventory check shows such things, for example, as 23 large engine lathes, 13 planers, 23 horizontal and 15 vertical boring mills, 18 milling machines, 9 drill presses, 14 grinding machines, 6 presses, 5 slotters, 2 gear



Resembling operations on large tank components is this boring mill setup for finishing key surfaces on the armor plate shield of a gun director

planers, 3 shapers, 3 power saws, plus other miscellaneous metalfinishing equipment required for both production and maintenance work.

Three of the more spectacular machines are illustrated herewith. One is a horizontal boring mill equipped with a step cutting and hurdling head, designed and built at the factory, which will machine surfaces of nine different heights at one stroke. Another is a multiple setup on a 25-foot vertical boring mill table, wherein eight 3-inch/50-caliber gun carriages are clamped to the table which traverses past a 3-inch "portable" milling machine to mill angular clearances. A third is a big 8-inch horizontal boring mill at work on a shield of cast armor plate for a heavy gun director which will be used to automatically point and train batteries on navy fighting ships.



Inside view of Thew plant showing assembly area, parts storage and materials handling equipment used in fabricating heavy handling units

Self-propelled crane loading trailer. Each trailer is loaded for delivery to only one department. No individual pieces are delivered

Incentive Handling System Up

By developing a planned method of operation and instituting a wage incentive program for materials handling crews, one manufacturer of power shovels and cranes is getting maximum efficiency from manpower and equipment

APPLICATION of incentives to materials handling increased production 25 per cent and reduced manpower by 62 per cent at Thew Shovel Co.'s Lorain, O., plant. The incentive system is now paying off after two years of careful study and rearrangement of materials handling facilities to handle the flow of parts and subassemblies needed in manufacturing power cranes and shovels.

The largest and more bulky pieces of incoming materials are stored outside and the smaller parts in warehouses. Operations require the delivery of these parts to fabricating sections of the plant and for their removal later as finished components to outside storage awaiting final assembly and shipment.

Four-Week Cycle — Processing departments work on a basis of completing all manufacturing operations for a group of machines in four weeks. For scheduling purposes, production schedule clerks are stationed in each department to maintain a proper machine tool load so that all parts are finished on time.

The warehouse division must have 24 hours lead time to deliver materials to the various departments. This calls for careful planning and integration between manufacturing and warehousing—the responsibility of the production schedule clerk.

Material is ordered by dispatch ticket, originated by a schedule clerk. Every two hours these tickets are forwarded to the warehouse central dispatch office. A multicopy unit, the dispatch ticket serves several purposes. It is a requisition for the material, a shortage slip, authority to move the material, a stock control record and as the record on which the payment of the incentives is based.

Chief Dispatcher Starts the Job — When the dispatch ticket reaches the chief dispatcher the material handling job starts. All warehouse storage facilities are provided with a positive space assignment for each part, regardless of size and whether stored inside or outside.

For material stored on skids, pallets and in large steel tote boxes one type of four-wheel trailer is used. For large castings and steel items such as angle, plate, channel, etc., a trailer capable of carrying 15 tons does the job. In conjunction with these trailers, Thew uses two of its own products: Self-propelled cranes mounted on rubber-tires, which can travel at about 8 mph, and are operated by one man who controls all crane operations, plus traveling, steering, braking, etc. One of these has a lifting capacity of 20 tons; the other 15 tons. Each is equipped

Production 25%

By WILLIAM J. ALLABACK
Plant Manager, Thew Shovel Co.
Lorain, O.

This "flag-man" works ahead of the crane crew lining up material for the trailer loads

STANDARD DISPATCH TICKET FORM 959 REV. 1 8-28-50

Date
Part Number
Part Name
Order No.
Quantity On Order
Operation No.
QUAN. MOVED
TOTAL TO DATE
TO
Moved By
From
Dispatcher
Remarks

GREEN COPY TO CENTRAL CONTROL
WHITE COPY TO MATERIAL HANDLER
PINK COPY TO PRODUCTION CONTROL NEXT OPERATION
YELLOW CARD WITH MATERIAL

Dispatch ticket is a multicopy unit that serves as a requisition for material, as a shortage slip, as authority to move the material, as a stock control card and as the record on which payment of incentives is based

TRAILER SCHEDULE

TIME a. m.	TRAILER NO.	FROM	TO
7:30	#7 or #8	1 W 49	1 W 12
8:00	#3	1 W 1	1 W 12
8:45	#3	1 W 12	1 W 1
9:00	#7 or #8	1 W 12	1 W 49
10:00	#2	1 W 3	1 W 49
10:30	#3	1 W 1	1 W 12
11:00	#7 or #8	1 W 49	1 W 12
11:30	#6	1 W 41	1 W 49
12:00	#3	1 W 12	1 W 1
12:15	#2	1 W 49	1 W 3
12:30	#7 or #8	1 W 12	1 W 49
12:35	#5	1 W 49	1 W 40

Trailer schedule by which material transfers are controlled throughout the plant and storage areas

with a special hitch to the trailers for towing and pushing.

On handling small castings and parts from internal warehousing to processing departments, or from there to the warehouse, the same standard model four-wheel trailer is used. In these cases the trailers are loaded by lift trucks. This permits moving 20 lift truck loads at one time and saves the wear and tear of long distance shuttle travel for the trucks.

The equipment setup for handling materials at the main No. 1 plant: Seven trailers, two rubber-tired cranes, one rubber-tired tractor, five rider type lift trucks and two walker type lift trucks. Certain trailers are assigned specifically to the structural shop, machine shop and warehouse. At plants No. 4 and 5 a crane and two trailers are used. For all the operations performed by any and all of this equipment—trailers, cranes, lift trucks—premium or incentive pay plans have been evolved.

The warehouse chief dispatcher sorts the tickets as they are received from all departments into groups designated as yard crane No. 1, yard crane No. 2 and tractor. He further sorts each group by type of material, such as steel, rough castings, etc. He then assigns the area location to each ticket, and is ready to release the tickets to the warehousemen.

No Mixing on Trailers—Through time standards the chief dispatcher knows how much material can be loaded onto a trailer and delivered to its destination in a 2-hour period. Materials for more than one department are not mixed on one trailer. The trailer is loaded for delivery to one department only, and a new trailer load delivered to each department at least twice in an 8-hour shift.

With this equipment and with 24 hours' lead time, definite and regularly scheduled routes developed for this equipment to follow. Except in a rare emergency, no individual pieces are delivered. Everything moves by the crane-trailer "trainload."

The job involves not only the delivery of raw materials to the processing units but also includes the picking up of processed parts which must be moved

into storage pending their later use in the final assembly. Each processing department has an outgoing dispatch area where they place outgoing material, with a suitable dispatch ticket attached to it.

Two Hours to Unload—When a trailer load of raw material is delivered every 2 hours to a processing department a trailer load of finished material should be ready and waiting for removal. The crane unhooks from the trailer of raw material, hooks onto the trailer of finished material and moves it according to the dispatch ticket instructions. The processing department now has 2 hours in which, first, to unload the raw material by overhead crane or by lift trucks and secondly, to reload the trailer with finished material to be ready for the next trip. The 2-hour standby periods at various stations explain the need for seven trailers and only three units to provide motive power.

This gives all moving equipment a pay load in each direction. At Thew the operational plan is referred to as the railroad schedule. The crane-trailer train cannot be late.

Incentive Plan Developed—Standards department men were assigned to various sections of the warehouse as well as to each piece of moving equipment including trailers, cranes and lift trucks. For many days they followed each operation or each man for a full 8-hour period, recording each move made and the elapsed time. These men made a total of over 4000 elemental time studies requiring over 3000 manhours of effort.

They studied various operations in detail—for instance, on loading trailers for the structural shop they took readings for items such as material handled, crew size, number of tickets processed, weight of load, number of pieces, approximate boom angle, radius of operation, degrees of swing, time to hook-up trailer, distance moved, moving time, time to change slings, time to check ticket and stock, attaching sling, placing sling on load, time to raise and swing load, time to position and lower load, removal of sling, time to unhook trailer, avoidable delay, unavoidable delay. Similar studies were made on lift truck operations such as unloading and moving raw material into the plant, moving finished material from the plant out to the trailer stations, etc.

Three-Man Crew—From studies of this research data the present incentive pay plan was established. Time studies indicated that for outside operations the best balance that could be obtained from yard cranes would be by using a crew of three men consisting of an operator and two hitchers. The studies further indicated that greatest elapsed time resulted when the crane and crew arrived at the material location, then spent time selecting required quantity from the pile.

The most economical approach to eliminate this lost time of two men idle while one man counted, was to employ a "flag man." This man works ahead of the crane crew, counts the number of bars of steel, or the number of castings and places a green flag under the last piece in the quantity to be moved. In this manner the crane crew comes along, drops chains on hook around the pieces selected, loads the material onto the trailer and moves on to the next lift. One flag-man serves two crane crews.

Two Per Cent Earning Variations—Through careful analysis the average time per lift was determined, the average number of lifts per trailer and the average travel time per trailer. Accuracy of these selected time factors is proved by the fact that the weekly earnings for each employee do not vary more than 2 per cent from week to week.

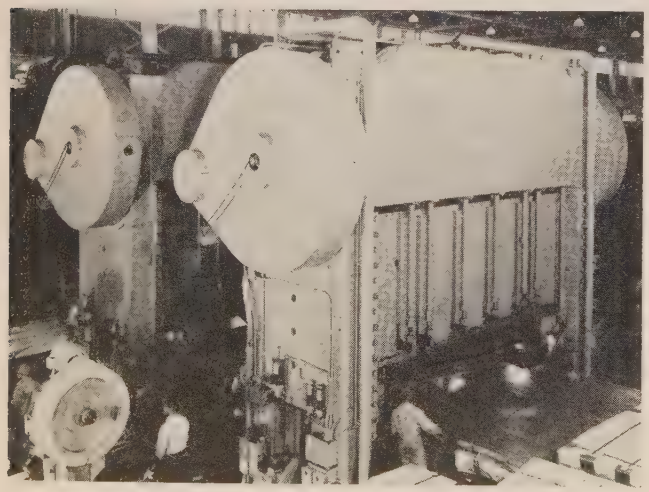
One copy of the dispatch ticket is retained by the yard crane operator who acts as crew chief. The crane operator's copies of the ticket are turned over to the chief dispatcher who in turn forwards them to the payroll department for recording and payment.

The entire crane crew is paid on the same basis of premium hours earned. Earned hours are calculated by the base rate of each crew member, thereby providing the earnings differential for each crew member according to his evaluated base rate.

On the machined parts, which are stored inside, machine shops use a particular type of container whether it be a pallet, skid, tote box, etc., and place a specific quantity of parts in this container. Again using average times taken from time studies, the internal material handlers, who also move materials from station by means of hand lifts trucks, are paid on an incentive basis, which is determined by the number of skids, pallets, etc., handled plus a studied time allowance for loading and unloading trailers in their dispatch areas.

All small parts, such as bolts, nuts, etc., are received in standard commercial shipping containers. Upon receipt they are immediately weigh-counted into predetermined quantities in any one of three different sizes of storage pans, depending upon the size of the part and the monthly usage. Premium rates are established for this counting and storing in assigned location. Loading operations here are handled by lift trucks working on an incentive plan.

Ford Installs Giant Rail Presses



OVERSIZED crankshafts and flywheels exert rated 2000-ton capacity 1 inch above bottom of stroke on these giant rail presses being installed in the frame and cold heading building at Ford's Rouge plant. A total of five presses are being installed to form automobile frame side members. They were built by E. W. Bliss Co. at its Toledo, O., plant. Each press weighs about 500,000 pounds and measures 220 inches between the uprights

BALL bearings are necessarily made to close tolerances which apply not only to the balls and races but also to the retainers which must have exact dimensions and shapes. This matter of retainer quality has been given careful study by the Stephens-Adamson Mfg. Co., Aurora, Illinois, maker of the well-known SealMaster Industrial ball bearing units. The company collaborated closely with the Revere Technical Advisory Service in working out the specifications and forming procedures for its brass retaining rings. As a part of this joint activity, Revere made a full survey of Stephens-Adamson requirements, with the object of standardizing and simplifying specifications for the benefit of both the engineering and the purchasing departments. The success of this work is indicated by this statement from the Superintendent of SealMaster bearing production: "First and foremost, I am pleased with the uniformity of gauge and temper of the Revere brass we have been receiving. This uniformity makes it possible to produce ball retainers of very close tolerance, with a minimum of rejections and at comparatively low unit cost. Furthermore, I have appreciated the dependable delivery service and the cooperation of the Revere organization."

In these times of scarcities, when it is more than ever necessary to reduce waste and save metal, you may wish to take advantage of Revere's skill and know-how in non-ferrous metals. Just get in touch with the nearest Revere Sales Office.

ABOVE, the largest retainer made for a SealMaster industrial ball bearing unit, contrasted with the smallest block and retainer.

BELOW, three of the steps in retainer production: blanked, formed and punched, and assembled part ready to receive the balls.

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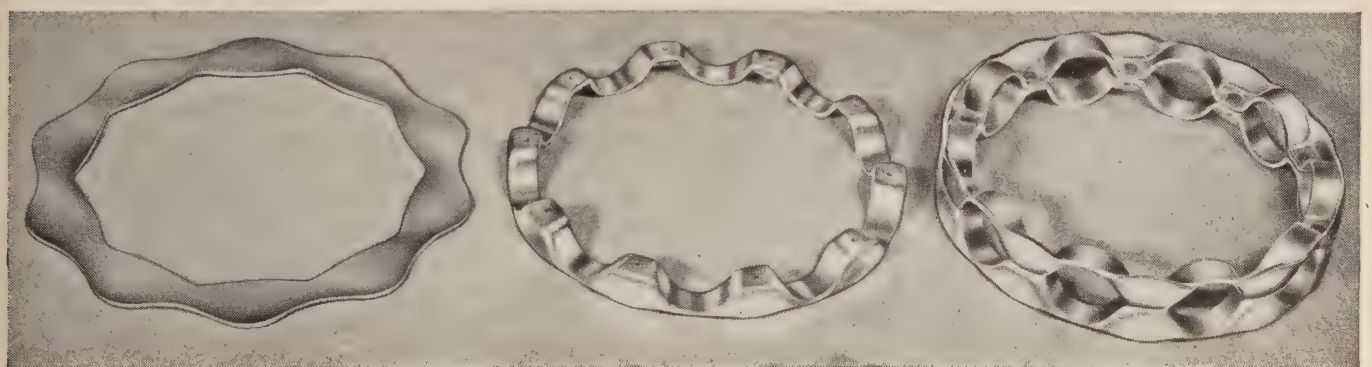
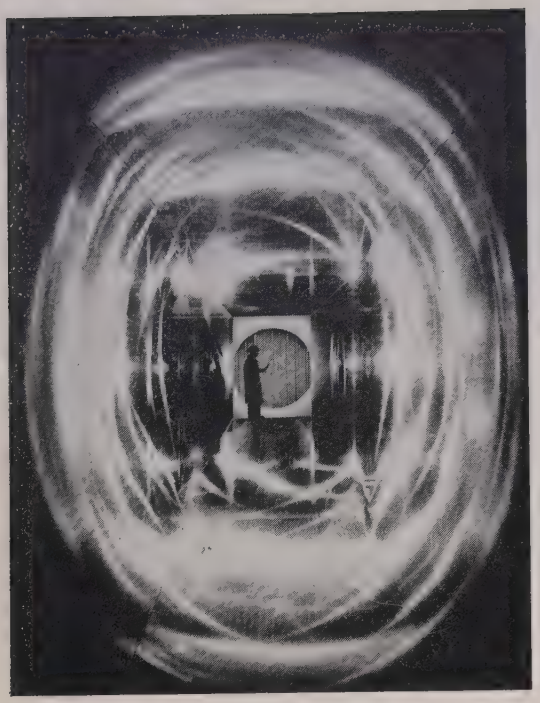
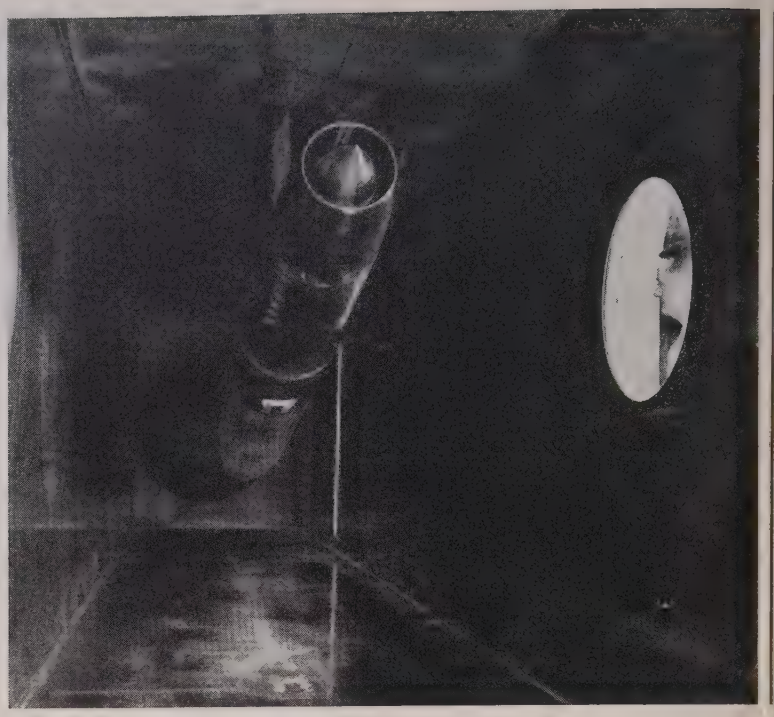




Brilliant light reflections show the high degree of polish on stainless steel plates lining the interior of the supersonic wind tunnel



Burning model of a 16-inch supersonic ramjet engine being tested for simulated speed of Mach No. 1.8 in test section of tunnel. Technician observes test through plate glass port

Stainless Steel Vital to Aircraft Research

STAINLESS steel is playing an important role in the search for new upper limits in supersonic flight. Before either aircraft or guided missiles are tried out in actual flight, they are subjected to exhaustive tests in wind tunnels maintained by the National Advisory Committee for Aeronautics. Stainless W, a special alloy developed by U. S. Steel Corp., is used for the plates that line a supersonic wind tunnel for testing engines under simulated high altitudes at NACA's Lewis flight propulsion laboratory in Cleveland.

Various factors enter into the design of a supersonic wind tunnel that are not encountered in other types of structures. Not only do the plates that make up the tunnel have to have certain strength factors but the smoothness of the walls is of great importance.

Handling with Care — Special materials must be used to handle air velocities 1.4 to 2 times the speed of sound (about 760 miles per hour at sea level). Lewis laboratory's 8 x 6-foot test chamber is the world's largest supersonic tunnel and uses 2 million cubic feet of air, weighing almost 75 tons, per minute at maximum operating conditions. This air must be extremely dry to prevent condensation and velocity disturbances in the test area. Passing the air through 2-foot beds of activated alumina weighing 1200 tons removes as much as a ton of water per minute on a hot, humid day.

From the drying beds the air moves to a plenum chamber and then to a seven-stage axial flow compressor 17 feet in diameter and driven by three 29,000-hp electric motors in tandem. It leaves the compressor at pressure of about two atmospheres but at low speeds and then is expanded in the tunnel to produce the desired velocity for the test. Moving into the tunnel through the small area of an entrance funnel or throat, the air reaches the speed of sound and as the tunnel passage is expanded, accelerates until the desired supersonic speed is reached.

Flexible Walls—Expansion of the tunnel passage is controlled by flexing stainless steel side plates that are 35 feet long, 8 feet high and 1 inch thick. The plates are supported on rollers and moved in and out by hydraulically operated screw jacks, 14 for each plate. Laboratory scientists wanted stainless because corrosion on inside surfaces of the tunnel would cause turbulences in the air and distort the test calculations. Further requirements are high strength and flexibility since the material must withstand repeated flexing without taking a permanent set. Material also must have the ability to be machined to accurate dimensions and then hardened.

Plates for the entire tunnel include: Section 1—a hopper shaped entrance funnel, 3 feet long; section 2—top and bottom plates, 6 feet wide and 35 feet long, and flexing plates, 8 feet high and 35 feeet long; section 3—top and bottom plates, 6 feet wide and 20 feet long, and side plates, 8 feet high and 20 feet long; section 4—top and bottom plates, 6 feet wide and 18 feet long, and side plates 8 feet high and 18 feet long; section 5—the exit funnel, 3 feet long. The overall length of the tunnel is 79 feet. Section

4 is the test section where the airplane model, jet engine or guided missile to be tested is placed. It has four plate glass windows through which the test may be observed and through which motion pictures may be taken.

Although stainless W had never been made in the large quantity required for this job or rolled in such outsize dimensions, U. S. Steel undertook the project. It was made in an electric furnace at Duquesne, Pa., by Carnegie-Illinois and then rolled into plate 1⅝ inches thick and rough machined at the Homestead, Pa., plant.

Much-Traveled Plates—Next step took place at the American Bridge Co.'s Ambridge plant where backing-up beams were welded to the back of all plates for greater strength and rollers were welded to bottom of transverse beams. Returned to Homestead, the plates were heat treated and straightened. Continuing their cross country tour the flexing plates were sent to the East Chicago, Ind., plant of Continental Foundry & Machine Co. and the remaining plates were delivered to Continental's Wheeling, W. Va., plant for machining to a polished finish. The rough and finish machining reduced the original 1⅝-inch thickness to 1 inch.

Back again to Ambridge, the plates were completely assembled and then dismantled for shipment to the installation. Erection was done by an American Bridge Co. crew.

Porcelain Enamel Aids Defense

The Porcelain Enamel Institute's government business committee announces it is currently distributing information to all government and military defense procurement agencies, concerning advantages of porcelain enamel as a substitute for critical materials, particularly in corrosive-resistant and heat-resistant applications.

The committee points out that porcelain enamel is resistant to most acids and alkalies, and currently is serving in place of bright metals and other critical materials. These include strainer plates and stripping column plates used in the manufacture of synthetic rubber, refinery bubble caps, pneumatic conveyor tube liners in the plastic, brewing and grain industries, and as a lining for food processing equipment—valves as well as piping.

Use of porcelain enameling furnaces for defense purposes is also being studied by the committee.

They have found that demand for new furnaces needed for heat treating aluminum and steel is progressing beyond the capacity of equipment producers, thus creating a need for conversion of existing related equipment. To aid institute members, the committee has prepared a report on the technical aspects of furnace conversion, and plans to have soon a report on the potential defense jobs for which the converted units may be used.

Navy Considers Hull Plate Specification Changes

By J. E. WALKER
Bureau of Ships, USN

TO KEEP its hull plate specification modern, the Bureau of Ships, Navy Department, is presently considering changes which would incorporate the newest metallurgical knowledge into the existing specification 48S5. The one primary consideration is the improvement of the low temperature notch toughness wherever this can be done without unduly increasing the cost of the plate and not seriously eliminating any major source of supply.

Important changes proposed:

Grade M (medium hull plate) — The present maximum carbon of 0.31 will be reduced to a lower level with the mechanical properties remaining unchanged. A higher level of manganese will be permitted if necessary to compensate for the lower carbon.

Plates ⅞-inch thick and over must be made by fully killed fine grain practice. Plates ⅞-inch and over shall be normalized.

Grade HT (high tensile)—No new change is contemplated for this grade. The requirement that all plates ½-inch thick and over shall be normalized will be continued in effect. This requirement was added as an amendment to the specification in April, 1950.

Grade HY (high yield)—A companion specification will cover a new high yield strength grade of structural steel with a yield strength level of approximately 75,000 psi. The steel required is a fully heat treated (quenched or normalized) and tempered low alloy steel. In addition to the yield strength requirement, a Charpy keyhole value of 40 ft lb at −40° F is also required. It appears that for the time being, a minimum of 2 per cent nickel will be necessary; however, every effort will be made to reduce the amount of this critical element as more experience with various experimental alloy steels is accumulated. Carbon will be limited to 0.20 per cent maximum to aid weldability.

This plate material is intended for the construction of welded warships and is thus intended to be of the highest quality and property levels commensurate with reasonable cost and a source of continued supply. Since welded construction is predominantly employed, all hull steels and especially the new HY grade must have proved weldability characteristics. Electrodes for quality manual arc welding of these steels are already available under National Military Establishment specification MIL-E-986, grade 180 for steel grades M and HT, grade 230 for grade HY.

Steel Partitions Cartoned at 28% Labor Saving

SPECIALLY designed cardboard cartons for shipping less than carload lots of movable steel partitions, wainscoting and steel doors will save E. F. Hauserman Co., Cleveland, approximately 13 carloads of crating lumber per year with a 28 per cent reduction in labor costs.

These and about a dozen other advantages were sought when the Hauserman engineers began to study crating problem: Ease of handling and reduced shipping weight, lower shipping costs, reduced setup and get-ready time, sufficient flexibility to take doors and steel panels of different sizes, reduction of lumber inventory and lumber storage area, and reduction of the floor area required to handle the various packaging operations.

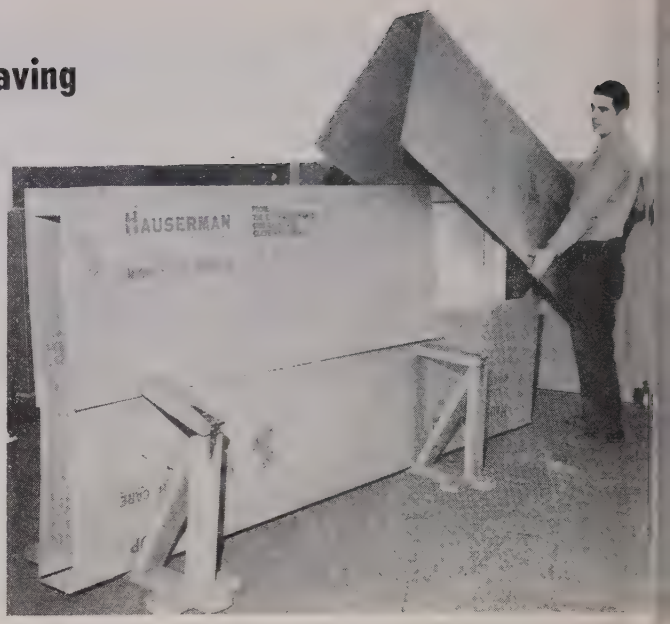
Damage Down—Although the finished products are coated with mar-resistant enamel, there was always danger of damage when they were shipped in wooden crates. The cartons are completely enclosed packages. There were additional considerations such as reduction in storage area on construction jobs and ease of handling. Another desired feature was the reduction of the problem of cleaning up the crates on the building site.

Most suitable carton material was found to be a sheet of 350-pound test, double-faced cardboard with C fluting, 58¼ inches wide and 76 5/16 inches long. Four of these sheets are used for each carton. The size was selected to fit a standard steel partition panel that measures 3½-feet wide and 9 feet 2½ inches long.

The cardboard sheet is creased along its length 26 inches from either edge and creased along its width 6⅝ inches from one end. The sheet is slotted at the creased end. Creases and slots permit the sheet to be folded twice along the length and to be folded over at the end.

Shocker Pads Used—In the packaging process each sheet is folded over the units. Two of the folded sheets are telescoped together and two or more shocker pads placed inside the folds. The panel unit to be packed is laid on the shocker pads which are 2½ inches thick, 6 inches wide, and 30 inches long. Pads are made of nine layers of nontest corrugated cardboard, and is grooved to fit tightly on the material being packed.

Following this operation, two or more shocker pads are placed on top of the door or panel, and two folded cardboard sheets placed over it to cover the door or panel completely. The telescoping sheets are moved so that the four sheets make a snug package. Telescoping of the folded sheets makes it possible to package its smallest or largest steel panel or door, using the same size cardboard sheets for every carton the company ships.

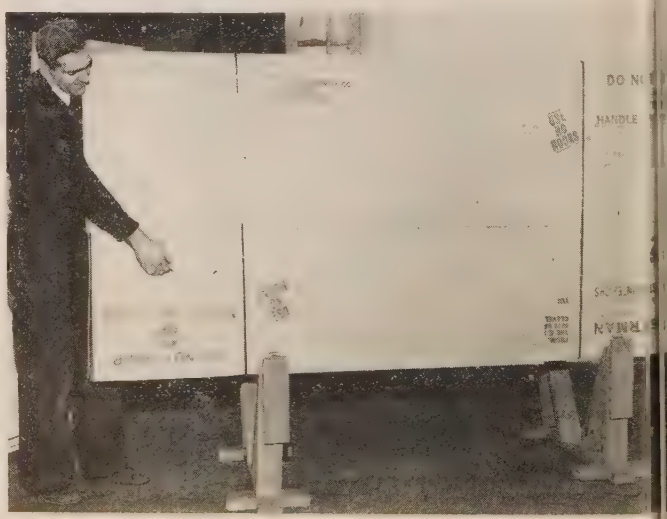


Steel partition panel unit is laid onto shocker pad inside the folded cardboard sheets. Then shocker pads are placed along the top edge of panel and two more folded cardboard sheets placed over it

Final packaging operations consist of inserting longitudinal wooden struts to protect the contents, fastening these to boards at the end of package and wrapping the package in two or more ⅜-inch steel bands which are tightened and stitched. Bicycle hand holes are cut into each section of the carton for easy handling.

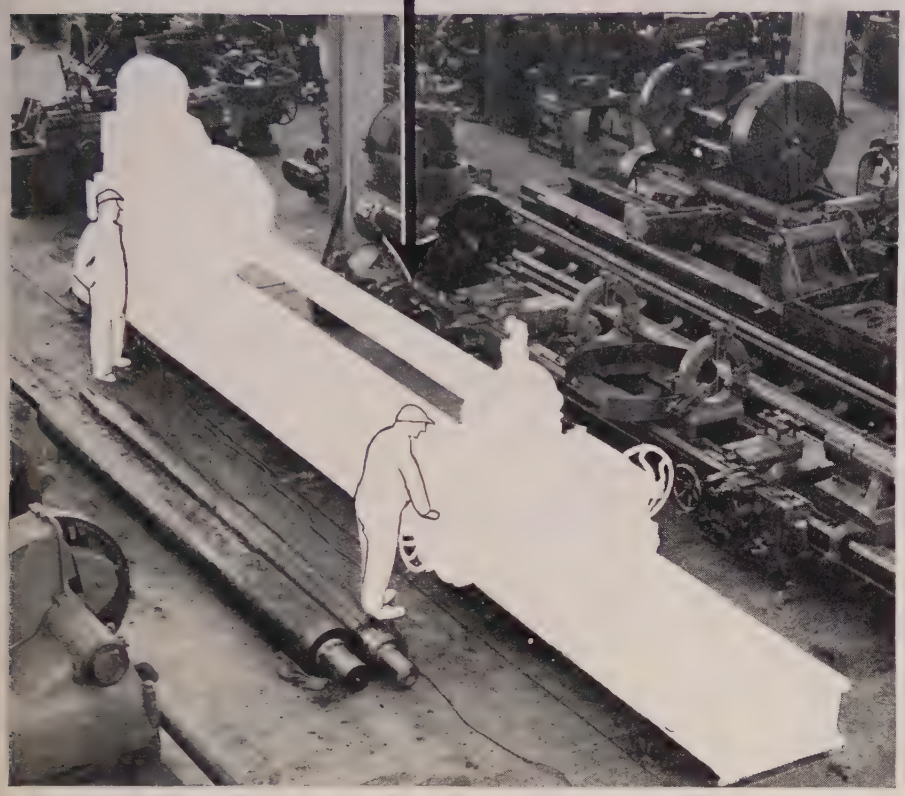
Approximately 98 per cent of the company's products shipped in less than carload lots are now being packed in the new cartons. Small parts, such as steel post caps and cornices, are packed in wooden crates. Saving on the use of cartons in the place of wooden crates ranges from $4 to $6 per package, in labor, material, burden, and freight. These are rather impressive figures.

Hauserman engineers were aided in this packaging problem by Ohio Boxboard Co., Rittman, O., the supplier.



Completed package being lifted off form by bicycle hand holds

Those "ON ORDER" machine tools won't get today's production done



. . . but ENGINEERED REBUILDING your heavy tools will!

Now that you're thinking about speeding up again—and deliveries of the larger machine tools are getting longer and longer—you will want to be sure that your equipment is in peak condition. Then follow this practice of leading metal-working manufacturers:

1. **Take a *physical* inventory of your machine tools, particularly the heavy, hard-to-replace ones.**
2. **Select those in need of rebuilding or modernizing that can be spared temporarily.**
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Gives Machine Tools a New Lease on Life

SPONGE IRON *a Remedy for Scrap Shortage?*

If small tonnages of good clean scrap are needed to make steel in electric furnaces, if a tunnel kiln is available and if the steelmaker is willing to pay at least $40 a ton for scrap with no residual alloys, here is how it can be made by the tunnel kiln sponge iron process

By P. E. CAVANAGH
Assistant Director,
Dept. of Engineering & Metallurgy
Ontario Research Foundation
Toronto

BECAUSE scrap is the lifeline of steel production any critical shortage in the supply of this material lends encouragement to research organizations to find a substitute.

Many times in the past, and especially during World War II, sponge iron was enthusiastically recommended as a remedy for such a situation. The U. S. Bureau of Mines, in particular, conducted extensive investigations into the possible uses of sponge iron to help remedy the scrap shortages which occurred. None of the suggested methods of producing sponge iron were developed to the stage of commercial operation.

Since 1946 the Ontario Research Foundation has carried on an investigation into the production of sponge iron. One object of this program was to try to discover methods for augmenting the supply of clean scrap in Canada in case of a scrap shortage. Since standard methods of reducing the amount of scrap necessary in steelmaking, such as increasing the proportion of pig iron in steelmaking charges, use of bessemer converters and other methods are well known, the study was largely confined to practical means of producing sponge iron.

The tunnel kiln sponge iron process is regarded as an excellent emergency measure, especially for electric steelmakers who are badly in need of small tonnages of high-grade scrap. The process also provides a method for making sponge iron profitably in normal times under certain specific economic conditions, especially where wage rates are low and existing tunnel kilns can be used. In some instances, the use of sponge iron in making high priced quality electric steels will justify the extra cost of this material even when the price of scrap is low.

Early information regarding the brick kiln process for producing sponge iron as carried on at Hoganas, Sweden, was not impressive. The method appeared expensive in manpower, and was only capable of small scale production at a competitive price. Furthermore, satisfactory performance seemed to depend largely on obtaining satisfactory containers or "saggers" in which to produce the sponge iron. On careful study of the available information concerning the successful commercial plant in Sweden, experimental work carried out in Germany during the war, and in the United States up to 1946, it appeared that considerable improvements might be made in the process.

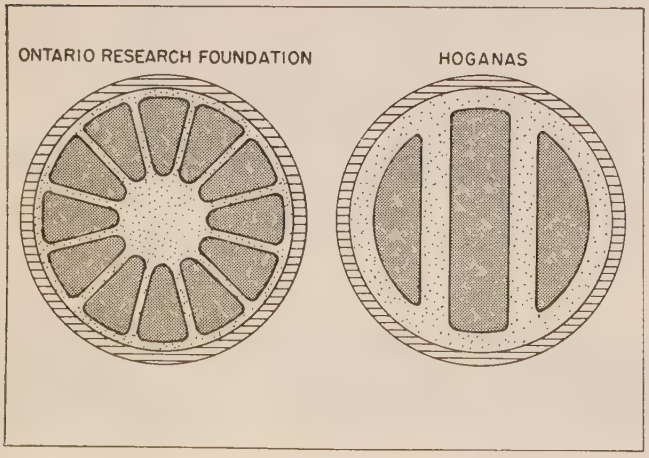
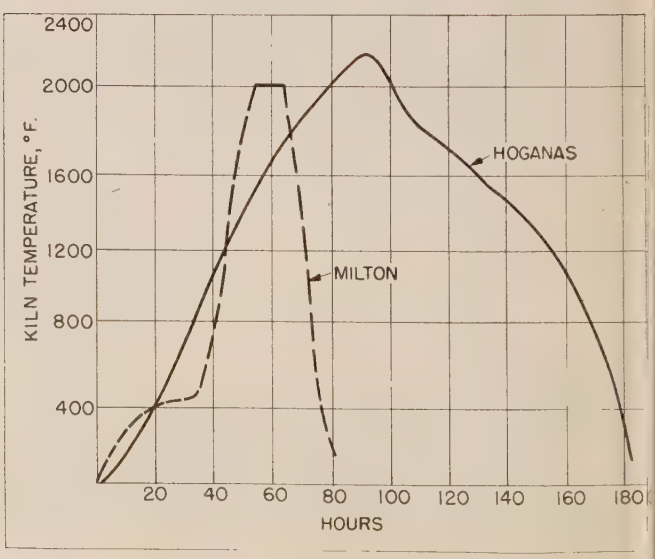


Fig. 1—Cross secton of cylindrical saggers. In Hoganas method the ore in the center of the central ore column is reduced last. The whole process must be delayed until this central portion of the ore is reduced. In O.R.F. method there is no ore in the center. The outer thickest part of each column is heated first and has a longer time at temperature. Reduction therefore is uniform throughout each column

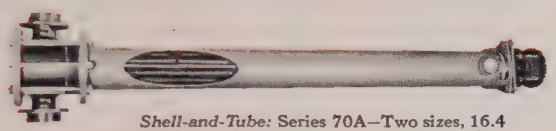
Fig. 2—Comparison of heating cycles



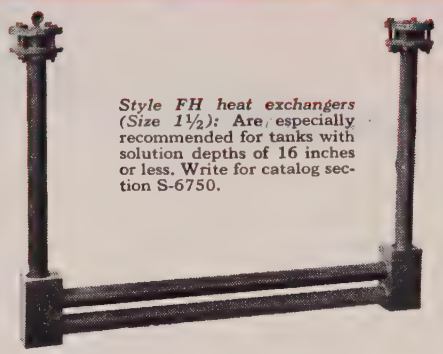
"KARBATE" BRAND IMPERVIOUS GRAPHITE HEAT EXCHANGERS *FOR ALL PURPOSES!*

The "Karbate" impervious graphite heat exchangers illustrated are used extensively as boilers, coolers, condensers, vaporizers, evaporators, heaters and absorbers in handling corrosive chemicals, either hot or cold. They *all* can be had in a complete size range. *All of them* offer the following advantages:

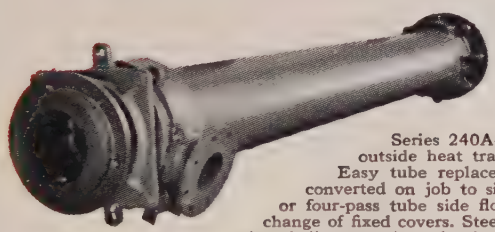
- **Highest heat conductivity rate of the practical corrosion-resistant materials.**
- **Highly resistant to corrosion by acids or alkalis, hot or cold.**
- **Freedom from corrosion scale, as compared to metals.**
- **Immune to thermal shock.**
- **No contamination of product.**
- **Strong and easy to install and maintain.**



Shell-and-Tube: Series 70A—Two sizes, 16.4 sq. ft., and 24.6 sq. ft. of outside surface area respectively. Tubes easily replaced in the field. Interchangeable single and double-pass construction.



Style FH heat exchangers (Size 1½): Are especially recommended for tanks with solution depths of 16 inches or less. Write for catalog section S-6750.



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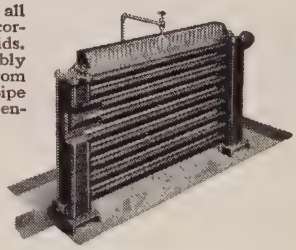

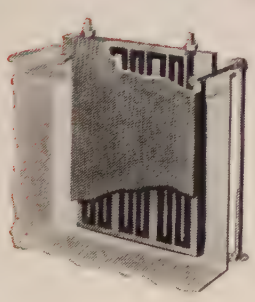

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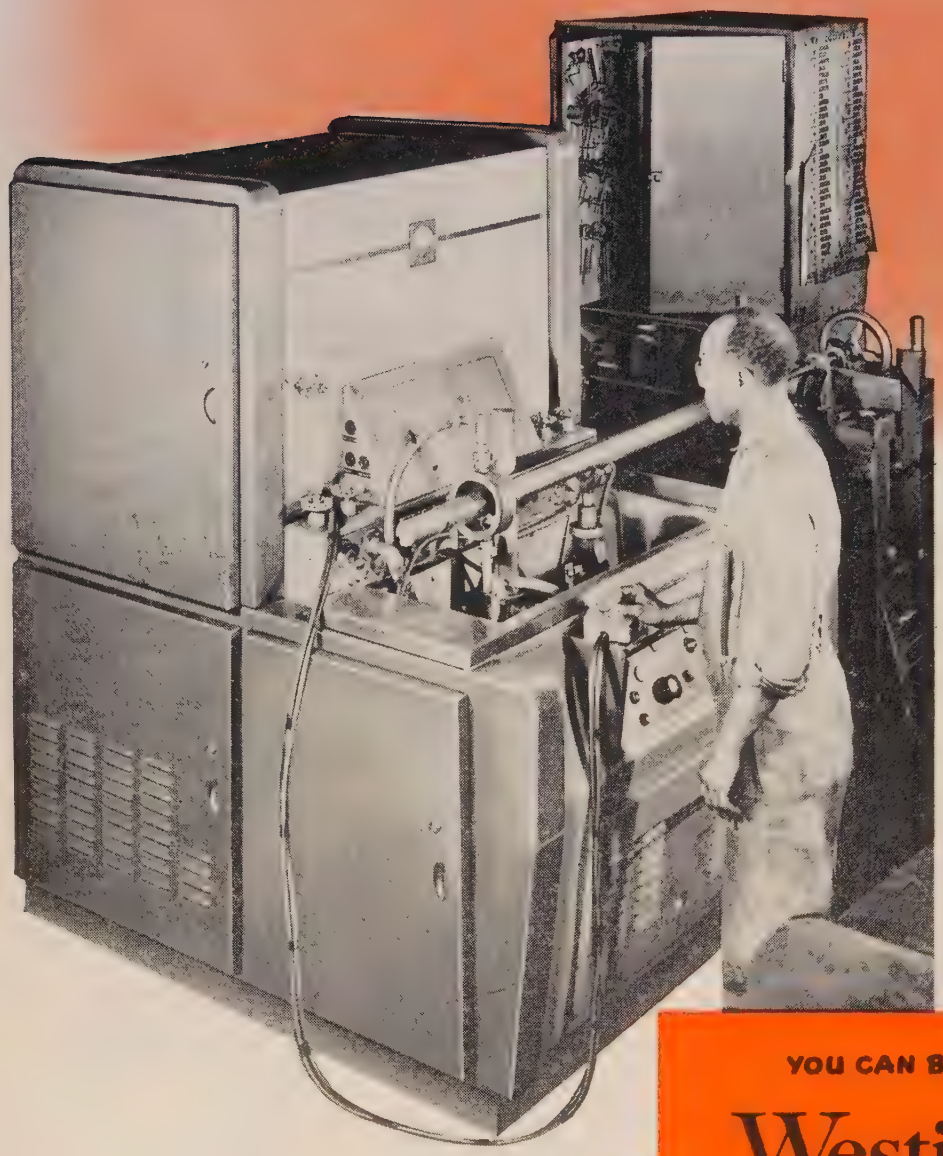

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J-02227

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INDUCTION HEATING

by a number of simple changes in the procedure.

Details of Process—Reduction of iron oxide to metal in a brick kiln is carried out by packing the oxide in fine coke, charcoal or coal in a suitable container or sagger and heating it to between 1900 to 2100°F, holding at temperature for the required time and then cooling. The reduced sponge iron must not come in contact with air while it is above 300°F.

The oxide may be mixed intimately with the reducing mixture, or may be placed in the sagger in horizontal or vertical layers with reducer between. The oxide also may be formed into bricks and stacked inside the sagger with reducer between the bricks. Fine limestone is added to the reducing agent as a desulphurizer.

Program of Investigations — During preliminary investigations of all available information on the brick kiln method of making sponge iron, it became apparent that the methods of charging saggers which had been used previously were not theoretically sound. The temperature gradient within the sagger dropped from the outside surface to the center of the sagger. It is vital that the ore should be at the chosen reaction temperature as long as possible within the sagger. The reducing gas, composed mainly of carbon monoxide, can be generated from the carbonaceous reducer, which usually is mainly coke breeze, at a somewhat lower temperature. It therefore became obvious that the ore should be distributed as close to the sagger wall as possible while the center of the sagger should contain no ore but only coke. The rosette charging design illustrated in Fig. 1 was developed and proved to speed up and shorten the process cycle about 25 per cent.

Methods for introducing the ore in rosette pattern were developed. Where loose, fine ore, such as a magnetite concentrate, is the material being used, a system of tubes arranged in rosette pattern is employed. Ore is poured down the inside of the tubes and the coke is introduced outside of the tubes. The sagger then is vibrated and the tubes withdrawn.

Alternatively, the fine ore can be extruded in the shape of wedge bricks the same length as the sagger height. These extruded bricks then are introduced into the sagger by a central sheet steel form which holds them in the rosette pattern. The reducing mixture then is poured and the form withdrawn.

Lump ore also can be charged to the sagger mixed with fine coke breeze and limestone. The lump ore must be sized preferably in a range of about minus 1 inch plus ½-inch for reasonably rapid reduction. After reduction the saggers can be dumped onto a screen and the lump sponge iron screened out of the finer reducing material. This is the easiest method of charging and operation to give the lowest costs. Unless there is some definite advantage in using a fine ore or a fine concentrate, the charging of lump hematite ore appears to offer the most profitable method of charging at present.

At this stage of the investigation, it became apparent that for reliable final information on this process a large scale pilot operation of an existing tunnel kiln in Canada should be carried on.

The pilot run was begun in February 1950 and the investigation stage has now been completed. The results have exceeded expectations and have indicated that this method for relieving serious scrap shortages can be of practical assistance in times like the present.

TABLE I
ANALYSES OF SPONGE IRON (RUN B)

Ore	Sagger Material	Per cent Fe — Total	Per cent Fe — Metallic	Per cent Reduction	S	SiO_2	CaO	C
Steep Rock	12" Metal	89.7	85.5	95.2	.020	6.2	...	0.32
	12" SiC	86.3	74.5	86.3	.037	...	...	...
	9" Clay	81.2	67.6	83.2	.052	...	...	...
Mill Scale	12" Metal	97.3	95.4	98.0	.030	...	...	0.68
	12" SiC	97.1	91.6	94.5	.054	...	...	1.35
	9" Clay	92.6	...	...	...	...	...	...
Mexican (H)	12" Metal	81.5	Lime		.093	3.32	13.9	0.13
	12" SiC	78.1	Interference		.098	3.42	10.8	0.05
Spanish	12" Metal	87.5	...	...	.054	5.88	0.6	0.92
Meneras	12" SiC	85.5	...	...	.048	5.83	0.6	1.22
	9" Clay	86.6	...	...	.025	...	0.5	0.35

These examples were chosen to illustrate some effects of ore composition and sagger material.

TABLE II
HEAT BALANCE, MILTON PILOT (RUN B)

		%
Heat In:		
Fuel oil	133	75
Coke used	45	25
	178	100
Heat Out:		
Heat of reduction reaction	62	35
Stack from preheat	55	30
Stack from drier	35	20
Material out	8	5
Vaporization of water	4	3
$CaCO_3 \rightarrow CaO$	1	1
Heat losses	13	7
	178	100

How Costs Are Determined — A wide variety of types of iron ore was investigated so that data are available allowing an approximate estimation of production costs with different types of iron ore. A simple method also was developed so that an interested steel company might quickly determine in the tunnel kilns available locally the costs and production rate which could be obtained with locally available raw materials.

This short test consists of providing a set of stainless steel tubes 12 inches long, all welded at the bottom to a flat plate of stainless steel. The set of tubes have diameters of 4, 6, 8, 10 and 12 inches. These may be made up by simply bending stainless steel sheet in a cylinder and welding it. The complete set of tubes is loaded with the proper mixture of locally available suitable iron ore, fine coke or coal and fine limestone. The tubes are covered with asbestos paper, tile or suitable sealing material. The set of tubes then is placed on a kiln car along with brick and passed through the tunnel kiln. The resulting sponge iron is analyzed. For satisfactory performance in steelmaking we believe that 90 per cent reduction to metallic iron is a reasonable requirement. The maximum size of tube which will produce 90 per cent reduced sponge iron in this particular tunnel kiln and heating cycle will be the required diameter of sagger which must be used in the kiln if the heating cycle is not to be changed.

The load of sponge iron which can be obtained per car can be calculated and from this the production and production costs can be estimated.

A major development of the investigation was the discovery that satisfactory sponge iron could be made

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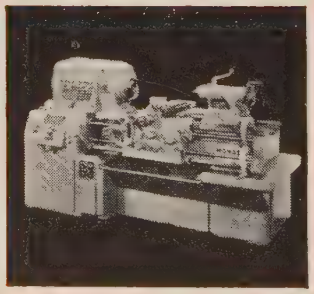

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In 12", 14", 16" and 20" swings. Offering such typical Monarch features as totally enclosed end gearing and gearbox—automatic pressure lubrication—all anti-friction bearings—hardened helical gears in headstock—American Standard Camlock Spindle Nose—flame-hardened and ground integral bedways—hardened alloy steel working parts.

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Turn, bore or face using a flat or a round template. With or without fully automatic cycle and infinitely variable feed. Applicable to complete range of sizes from 10" to 32" swing.

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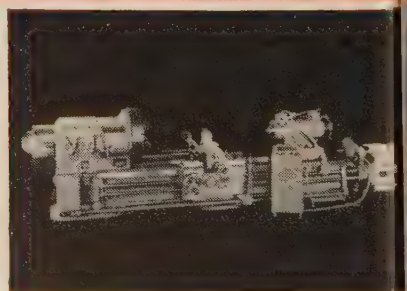


THE MONARCH New Development Building—where tomorrow's lathe developments are planned today!

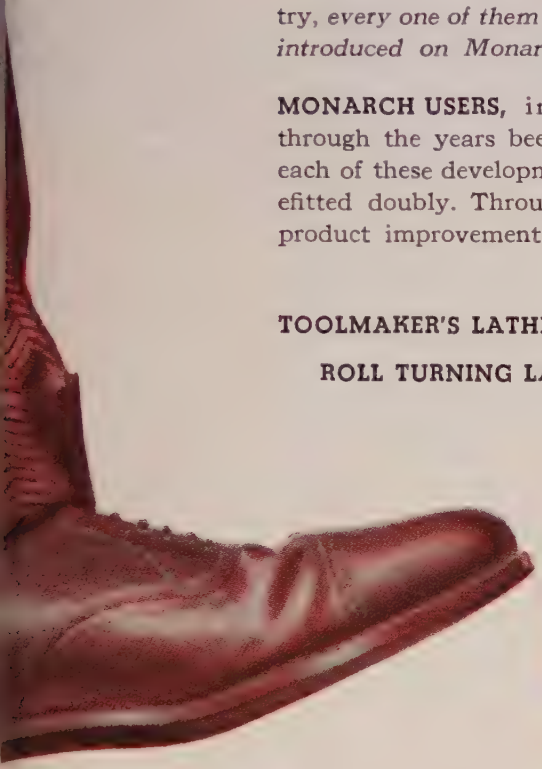
WHEN YOU LOOK more closely at the Monarch lathes below, there are two important points to keep in mind. First, you'll find in them every desirable production and design feature required to meet the highest standards—features playing a basic performance part in a line of lathes noted for improved accuracy, faster production and longer life. Secondly, it will pay you to remember that, while many of these features are now standard in the industry, *every one of them was developed and first introduced on Monarch turning equipment.*

MONARCH USERS, in other words, have through the years been first to benefit from each of these developments. And they've benefitted doubly. Through cost reduction and product improvement on one hand. On the other, through the purchase of lathes destined for a longer, unrivalled production life.

AS A MONARCH BUYER TODAY, you face the same enviable prospect. Our company, founded in 1909 and built on the principle of continuous research and development, devotes a major portion of its energies today to that principle. Our New Development Building, with its equipment and staff, is the physical symbol of our determination that the lathe improvements of tomorrow will appear first on Monarch products. It implements our promise that you can always rely on Monarch for the turning equipment to assure you peak production at minimum cost to keep you ahead of the parade . . . . . *The Monarch Machine Tool Company, Sidney, Ohio.*

TOOLMAKER'S LATHES • ENGINE LATHES • TRACER-CONTROLLED PRODUCTION LATHES

ROLL TURNING LATHES • AIR-GAGE TRACER, MOTOR-TRACE & KELLER CONTROLS



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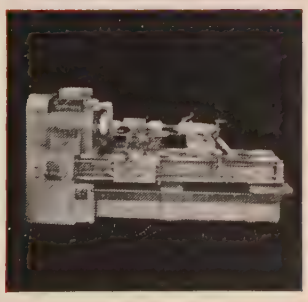

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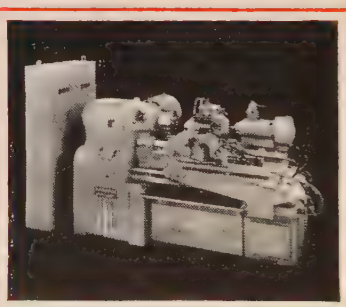

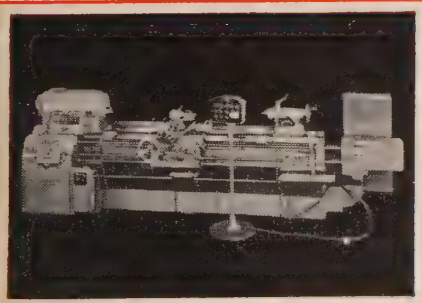

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The ideal tracer control for most step shaft work. This, with the "Air-Gage Tracer" and Keller Controls, provides Monarch users with a choice of either one of three distinct types of tracer control.

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A fast, precision, electronically controlled hand screw machine. Short setup time makes it practical for quantities of 25 or less—up to 3000 or more. As many as nine different speeds and six different feeds may be preselected to become operative at proper time in cycle. Suitable for first or second operation work. Speed range—40 to 4000 R.P.M.

along with brick in the standard tunnel kiln. This means that single cars could be charged and run in any desired proportion along with brick so that the full possible output of a kiln does not have to be produced if it is not required. In some locations it will undoubtedly be possible to arrange with a local brick company to charge odd cars with saggers and produce small quantities of sponge iron in order to investigate the advantages of this material.

Low-Slag Volume Desirable—The analyses shown in Table I indicate what can be expected from a representative range of ore types. In the process nothing is removed from the iron ore except oxygen and sulphur. It therefore is desirable to have a low silica ore in order to keep the slag volume in the steelmaking furnace down. Sulphur is removed from the coke and ore by limestone. Ores containing a large percentage of CaO will retain a much larger percentage of sulphur and may increase in sulphur content. The carbon content will range from about 0.3 to about 0.6 per cent with most ores.

An important characteristic of any ore which is chosen is the reduction rate. A high rate of reducibility is desirable since a greater production can be obtained. The only reliable way to determine the suitability of a particular ore for this process is to carry out the simple test heretofore described.

When this work was started we had some preconceived ideas regarding the results that would be obtained. These were based largely on our knowledge of the process used at Hoganas, Sweden, for the last 40 years. At Hoganas more than 90 per cent of the required heat for the process is supplied by burning the reaction gas emerging from the saggers. We discovered that with the process run at a lower temperature and much more rapidly, only about 25 per cent of the heat requirement is supplied by the reaction gas. The rest is supplied by efficient burning of fuel oil in properly designed burners. The coke required in the tunnel kiln process is considerably lower than the requirement at Hoganas.

Fig. 2 shows a comparison of the heating cycles when the Milton kiln was operated on an 80-hour total cycle. The cycle being used at Milton at present is only 36 hours during which 1 ton of sponge iron is discharged from the kiln every 50 minutes or a total of 28 tons per day. Table II shows the heat balance for the process.

Production Costs—Table III and IV show the production costs for sponge iron made from Steep Rock ore at Milton, Ont. These costs will be modified by local costs of the various materials. Substituting local costs in the tables allows approximate estimation of production cost of sponge iron in any locality.

As an additional check, cost of sponge iron will be equal to the cost of brick made in the same kiln plus the cost of the ore, coke and saggers.

Choice of suitable saggers at present is settled because of the lack of alloy metal for this purpose. In our work we have assumed that a sagger which would not last long enough to give a cost less than $5.00 per ton of sponge iron would not be satisfactory. Metal saggers of 15 per cent chromium and 35 per cent nickel alloy steel will give a sagger cost lower than $5.00 per ton. Our investigation showed that these saggers give excellent performance and should be used if possible.

Silicon carbide saggers give excellent heat transfer but their cost is high and they are subject to breakage in handling as is any ceramic sagger.

Several sources in the United States make clay saggers that will last between 10 and 25 cycles in this process depending on the composition and method of manufacture. The price for a sagger 12 inches outside diameter and 13 inches high is less than $2.00 and in some locations may be as low as 75 cents. Under present conditions alloy metal saggers are not available so clay saggers are the most suitable.

A complete description of the pilot plant results is available for those interested. During this work sponge iron was made from special raw materials and processed into iron powder. Some of this powder was the equivalent of Swedish iron powder which is made in the same manner. Iron powder produced from special sponge iron made in this pilot run had better properties after pressing than some iron powders now on the market in the United States.

Conclusions—Many tunnel kilns in North America are being used to make brick at temperatures in the neighborhood of 2000°F. Average production of a single kiln will be about 25 tons per day of sponge iron. Some of these tunnel kilns are close to steel companies who are desperately short of scrap from time to time. Although the cost of sponge iron made by the tunnel kiln process is high, it is possible to start production within a few weeks if satisfactory arrangements can be made with owners of operating tunnel kilns. Using this sponge iron as a dilutant

TABLE III
PRODUCTION COSTS AT MILTON FOR 90% REDUCED SPONGE IRON FROM LUMP STEEP ROCK ORE
(PRODUCTION 20 TONS/DAY—6500 TONS/YEAR)

Ore—1.85 tons of screened lump Steep Rock (+½" to 1½") at 54% Fe and $10.00/ton at Milton	$18.50
Coke—0.20 tons coke breeze at $9.25/ton	1.85
Limestone—0.40 tons Milton limestone at $1.00/ton	0.05
Fuel oil—52.0 Imp gals #2 oil at 15c/gal	7.80
Miscellaneous materials	0.10
Total:	$28.30
Labor 6.0 man-hrs	5.95
Repairs and maintenance—materials and labor at $1050/month	1.75
Plant overhead at $1050/month	1.75
Total:	$37.75
Maximum Production cost, assuming sagger cost for 6" diameter, 48" long tubes as maximum $5.00 and minimum $2.00	$42.75

TABLE IV
PRODUCTION COSTS AT MILTON FOR 90% REDUCED SPONGE IRON FROM EXTRUDED STEEP ROCK ORE
(PRODUCTION 15 TONS/DAY—5000 TONS/YEAR)

Ore—1.85 tons Steep Rock Seine River grade at 54% Fe and and $9.25/ton at Milton plant	$17.10
Coke—0.20 tons ⅛" coke breeze at $9.25/ton	1.85
Limestone—0.04 tons Milton limestone at $1.00/ton	0.05
Fuel oil—50.3 Imp gals #2 oil at 15c/gal	7.50
Miscellaneous materials, sagger tops, sand seal etc.	0.10
Total:	$26.60
Labor—10.5 man-hrs	9.77
Repairs and maintenance—materials and labor at $1050/month	2.35
Plant overhead at $1050/month	2.35
Total:	$41.07
Maximum Production cost, assuming maximum sagger cost for 15/35 metal saggers 9" diameter to be $5.00 per ton of sponge iron	$46.00

for scrap which may be high in residuals, or to make up deficiencies in scrap, may be a temporary solution to scrap supply difficulties.

Based on a thorough study of all commercially operating sponge iron processes, the Wiberg-Soderfors is the most efficient in fuel and labor utilization. Required investment is higher than for the tunnel kiln process but the Wiberg-Soderfors process should be used to produce sponge iron unless:

1. The ore to be reduced is a fine concentrate difficult to sinter or pelletize.
2. Fuel oil and coke breeze can be obtained at low cost compared to an equivalent amount of electric power.
3. Efficient tunnel kilns are already in existence and part or all of their capacity can be used to make sponge iron on the normal brick cycle.
4. It is more important to produce sponge iron as quickly as possible rather than as cheaply as possible.

Patents have been applied for on several of the features of the tunnel kiln sponge iron process which have been developed during the course of this work.

ACKNOWLEDGEMENT

Algoma Steel Corp. Ltd., Steel Co. of Canada Ltd., Dominion Foundries and Steel Ltd., and Atlas Steels Ltd. contributed equally to the test program, and the Ontario Research Council contributed an equal sum.

Iron ore was supplied at cost by the Steep Rock Iron Mines. Dock unloading facilities and ore storage were provided by the Steel Co. of Canada, Hamilton, Ont.

Extrusion facilities of the Ontario Brick & Tile Co. were used for preparing the fine ore; finished saggers were shipped from this plant to Milton Brick Co. where kiln facilities were rented to carry on the experiments.

Tool Steel Scrap Key to Metal Conservation

By H. M. GIVENS JR.
Tool & High Speed Steel Sales
Sanderson-Halcomb Works
Crucible Steel Co. of America

CONSERVATION and segregation of high speed tool steel scrap has been growing in importance over the past ten years. Prior to World War II practically the only effort to save high speed tool steel scrap was made by the large consumer of high speed steels, principally by the manufacturers of small tools such as drills, reamers, milling cutters, taps etc. Average industrial user of high speed tool steel did not concern himself with what he considered to be a minor matter.

During World War II, critical shortages of tungsten, molybdenum, cobalt and vanadium made the careful conservation and segregatoin of scrap industry's duty. It was natural to expect that at the end of hostilities there would be a great relaxation in this effort.

Now, we are again faced with a world situation which makes the conservation of carefully segregated high speed tool steel scrap of prime importance. The present critical shortages of tungsten, molybdenum and cobalt make scrap a matter that is of vital interest to both producers and users of high speed tool steels.

Four Scrap Groups—Many types of high speed tool steels are in use today. For the purposes of scrap conservation, they can be grouped into four general classes.

These are the high tungsten types containing about 12 to 18 per cent tungsten, 4 per cent or less chromium and varying amounts of vanadium up to about 4 per cent; the M-2 tungsten molybdenum type containing about 6 per cent tungsten, 5 per cent molybdenum and 2 per cent vanadium; the high molybdenum type contains about 8 per cent molybdenum, with or without tungsten, and 1-2 per cent vanadium. The fourth group consists of all the cobalt modifications of the types that are in the above mentioned groups.

It is of prime importance that scrap be kept segregated in accordance with these groupings. When scrap is mixed, its value to the tool steel user and to the manufacturer is vastly reduced since certain of the above types of high speed steel cannot be produced from scrap which contains alloys inherent in other grades. Therefore, to produce new steel in each of the above analyses, with the minimum use of virgin alloys, the tool steel mills must obtain substantial quantities of carefully segregated scrap.

Segregate Solids, Turnings—High speed tool steel scrap is purchased in two forms: Solids and turnings. They should always be kept separated because of the greater value of the solids to the tool steel producers and the consequent higher price to the seller.

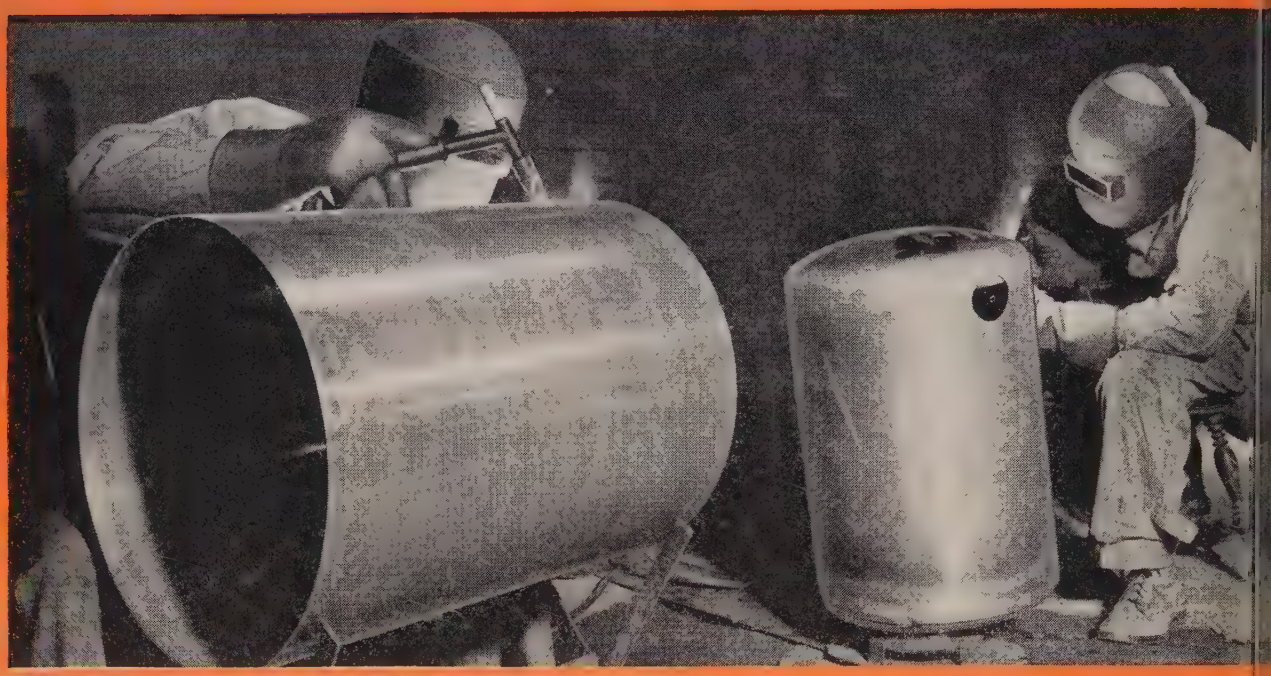
The manufacturer of small tools for resale generally produces scrap in the form of turnings, although some solids will be available because of unusable bar ends and tools which are spoiled in production. Where the consumer of high speed steel makes tools for his own use, he will probably have entirely solid scrap consisting of bar ends and worn-out tools. The user who purchases tools from a tool manufacturer will usually have solid scrap in the form of broken and worn-out tools.

Clean scrap is of prime importance and every effort must be made to accumulate and store scrap under conditions which will protect it from surface contamination such as oil, dirt or any other foreign matter. It is also imperative that scrap be accumulated and stored to prevent contamination by steel other than high speed steel or by the nonferrous alloys.

Alloys containing nickel, copper, lead, tin and similar elements will so contaminate high speed steel scrap as to seriously affect its usability, if not render it entirely worthless.

Segregation of high speed tool steel scrap will require careful management in many shops, but the higher prices paid by the tool steel mills for high speed tool steel scrap will more than offset any additional cost which may be involved in proper segregation. Certainly the manhours involved are in the national interest.

Airco Heliwelding process slashes costs...



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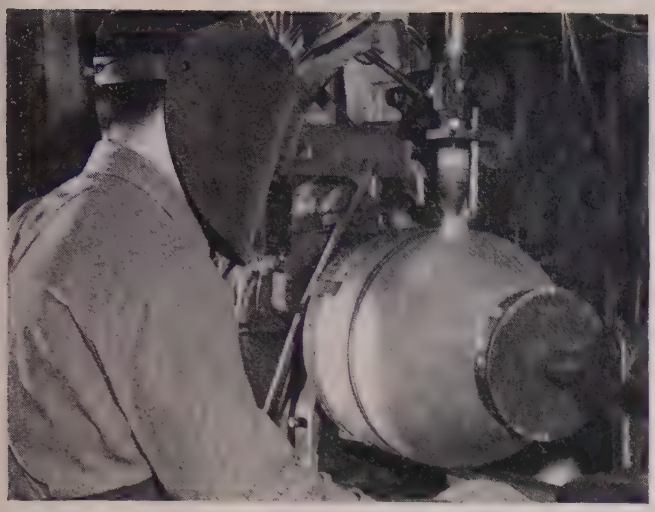
Heliwelding is one of Airco's inert, gas-shielded, arc-welding processes that permits all-position welding of aluminum, magnesium, stainless steel, brass and copper.

Particularly in the lighter sections of these materials, this time-tested, easy-to-use process has proved most economical. Older methods generally require use of fluxes . . . but the envelope of inert gas that shields the weld eliminates the need for flux . . . no slag is formed, thus permitting the operator a clear view of the puddle resulting in welds that are of unexcelled quality with such smooth contours that finishing is reduced to a minimum. This means savings in time, trouble and money.

Furthermore, Heliwelding's special characteristics — the complete gas shielding of a non-consumable electrode — provide a highly efficient and concentrated arc, which, in turn, permits welding at exceptionally high speed.

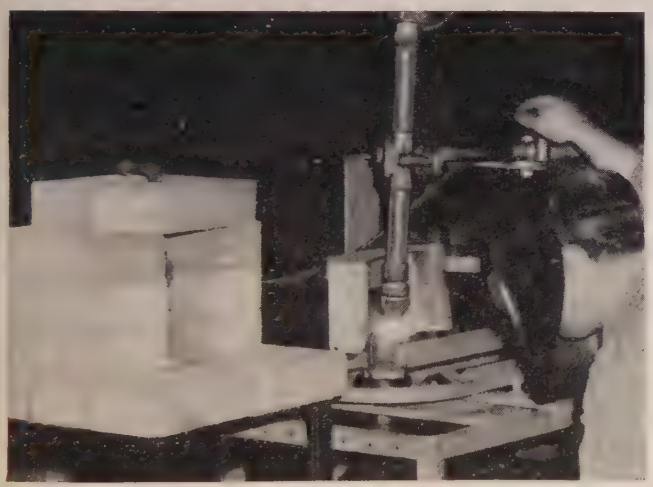
Another outstanding feature of Heliwelding is its minimization of distortion. This is due to its high speed operation with a small diameter electrode. Heat is concentrated to a pin point and moved rapidly along the work . . . thin sections are easily joined and protected by the fact that such a small amount of weld metal is required.

The case studies shown on these pages give you some idea how this exceptional process could help you. While the facts may be startling, they could very easily be applied in your own shop . . . but find out for sure. Write . . . or phone your nearby Airco office. Ask for a copy of ADC-709: "Heliwelding — Catalog 9".

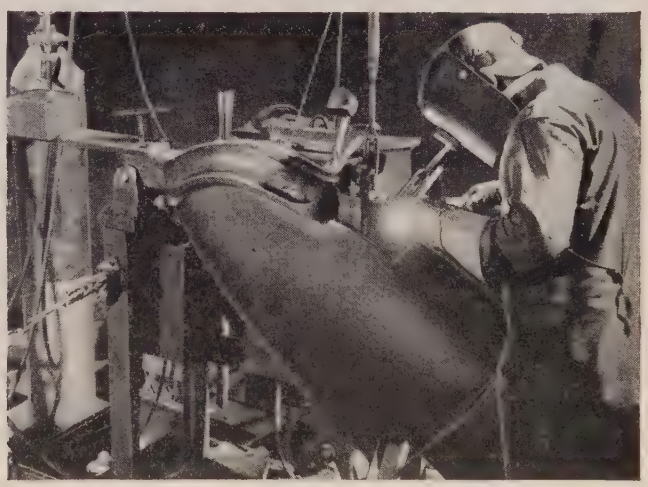


CUTS TIME AND MONEY COSTS . . . Hinman Milking Machine Company of Oneida, N. Y., found Heliwelding's ability to join stainless steel without a flux ideally suited to the fabrication of pails to be sold in conjunction with their milking machines. Top quality pails were produced quickly and easily; machine finishing was virtually eliminated and polishing reduced to a minimum — tidy savings of money . . . and time.

BUILDS A BETTER PRODUCT . . . Ducate Brothers, of Little Ferry, N. J., used Heliwelding to speed production and save cost in the fabrication of copper tanks for hot water heaters. They found this outstanding process extremely fast — and resulting in smooth, high-type welds greatly increasing the quality of the finished product.



PERMITS MECHANIZED MASS-PRODUCTION . . . Salkover Metal Processing Corp., of Long Island City, N. Y., adapted Heliwelding for mass-producing copper rotors for induction motors. Immediately production jumped to a new high, and costs dropped. Furthermore, Heliwelding permitted complete control of all operating variables — resulting in finer welds, with a minimum of rejects.



ELIMINATES DISTORTION . . . A prominent automobile manufacturer found Heliwelding most practical, both from a speed and finishing standpoint. Operating at 13″ per minute, Heliwelding produced a weld metal free from porosity and pinholes — distortion and splitting were completely eliminated on the .042″ sheet metal used to produce fender and similar assemblies.

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First Exploratory Effort in World Metallurgy

(*Concluded from Page 77*)

assistance for the past three years. They are: United Kingdom (aid terminated Jan. 1), Eire (aid ended in May), France, Italy, Belgium, Luxembourg, Netherlands, Denmark, Norway, West Germany, West Austria, Trieste, Turkey, Greece, Iceland and Portugal. Additional countries have been granted ECA funds from the last appropriation. A working agreement was drawn up with ECA whereby it would extend subsistence and travel allowance to selected delegates from the Marshall Plan countries coming to the WMC.

Invitations were dispatched to Washington ambassadors of all countries with significant metals industries, including Latin America, asking them to assist in appointment of conferees. American embassies abroad were enlisted in the project. Meanwhile Dr. Jeffries hied himself to Europe for an extended trip, talking with industrial people and government authorities and meeting an enthusiastic reception to the WMC idea. Concurrently, W. H. Harrison, head of the Defense Production Administration, has been chosen as government liaison man for the congress.

Upshot of the arrangements is that delegations from world metals centers will embark for New York early in September, to be received there with special ceremony, and then divide into groups for tours of some 150 leading metal producing and fabricating plants and research laboratories of the nation. These tours will cover eight categories: Steelmaking and refining; nonferrous refining, rolling and fabrication (copper, brass, bronze, aluminum, magnesium); ferrous rolling, forging and hot work in steel mills and heavy industry; stamping, cold work, machining and finishing in lighter industries; heat treatment, welding and joining; inspection and testing; and research, engineering societies and universities. A stopoff is scheduled first in Washington where the delegates will be greeted by the President.

Interchange of Ideas—A final summary of knowledge acquired in the inspection trips, together with an opportunity for swapping ideas between Americans, Europeans, Latin Americans and Asians will be provided by group meetings in Detroit, concurrent with the National Metal Congress there. Each of the foreign experts will have an "opposite number"—an American whose technical, scientific or business interests parallel his own as nearly as possible. Each of the foreign conferees—probably 200-300—has been asked to present a brief statement on some aspect of metallurgical practice in his plant or country which he believes worthy of international attention.

Finally there will be formal papers presented at technical sessions of the WMC by foreign authors who are planning to stress the more practical problems of conservation and substitution in the metals field, this being a principal theme of the congress along with summaries of the raw materials situation worldwide insofar as metals are concerned. Official languages of the meetings will be English and French, although it is expected all delegates will have a working knowledge of English.

An Introspective Look — Questions immediately come to mind which world metallurgists might well consider as they plan their contributions to the WMC. A few:

Is there a need for standardization of terminology or techniques in respect to metals research in the free world?

Are results of metallurgical studies in various countries readily available, understandable and interpretable in other countries?

What can be done to overcome nationalistic secrecy and reticence to disclose important developments which could aid others of the world fraternity?

How critical are basic metals shortages and alloy deficiencies in other countries and how might action be taken in concert to relieve them?

Is there a worldwide need for more exploratory work in developing raw materials sources, or can we get along with what we have?

Divorcing the metals outlook from the political outlook—if that is possible—there is patently much work to be done, either by today's generation of metallurgists or by their sons. We need to know more about the function and effects of nitrogen in both ferrous and nonferrous alloys. We need to know more about the effects of small percentages of alloys, like the inoculants, in iron and steel. We need to know more of the behavior pattern of alloys at subzero temperatures, at the high temperatures of the gas turbine, and under the extreme working pressures of extrusion machines. Metallurgists generally need to broaden their knowledge of other fields—quality control, designing, production processes, even human relations.

We need to find faster and less expensive reduction methods for the metals coming into larger volume use like zirconium, titanium, vanadium, molybdenum and others yet to appear. We need to know more about high-frequency electric currents in processing, treatment and fabrication of metals and alloys.

There is no lack of jobs to be done, and if they can be done on the basis of international co-operation on a metallurgical level then it is all to the good. Perhaps the technicians can succeed at a task of co-operation where politicians have failed.

Holds Arc Welding School

Welding operators and plant engineers in the Buffalo area are being shown the latest in arc welding techniques and apparatus at a school currently being run by Westinghouse Electric Corp. Theme of the school is the effective and economical use of available power, labor, and materials.

The course will include information accumulated by Westinghouse through its experience as a user of welding processes and maker of welding apparatus.

Running for five consecutive Monday evenings sessions held in Westinghouse's Buffalo plant will include lectures, films and discussions.

Measuring Adhesion of Electrodeposits

A simple, inexpensive method for determining the adhesion of commercial electrodeposited coatings has been developed recently by technicians of the National Bureau of Standards. The technique involves electrodeposition of an adherent, mushroom-shaped nodule on the surface of the coating to act as a grip for the application of a detaching force. The force required to pull off the nodule—together with a portion of the coating—is then obtained on a spring balance in ordinary mechanical units.

The adhesion of an electrodeposit to base metal is an important factor in the serviceability of the coating. While adherent coatings cannot be removed by any ordinary mechanical means, those with a lower degree of adhesion either may peel spontaneously or become detached if the plated object is flexed or abraded. Less adherent coatings are also more susceptible to corrosion, which spreads readily through scratches and imperfections in the surface.

Although a high degree of adhesion can be obtained readily by proper cleaning and pretreatment of the basis metal, adherent coatings cannot be conveniently and consistently mass-produced without effective laboratory control. Several methods therefore have been suggested for measurement of the adhesion of electrodeposited coatings in commercial production. None of these, however, has been generally applicable.

How To Grip Coating—The technique developed by NBS overcomes most of the difficulties associated with other methods. Perhaps the greatest problem has been that of gripping a thin coating in such a way as to apply a pull sufficient to detach it from the basis metal. This problem was solved by the formation of the mushroom-shaped projection on the coating under study. First, all of the plated surface is covered with a lacquer or stopoff. Then several small areas, about 1/16-inch in diameter are defined by plastic washers having tapered holes. The lacquer is removed from these small areas and the nodules are built up by plating the uncovered areas in a cobalt solution.

After removal of the plastic washers and stopoff material, the nodules are gripped in a chuck attached to a spring balance and detached by exerting force through the spring. The nodule always removes the initial coating, occasionally along with some of the basis metal if adhesion

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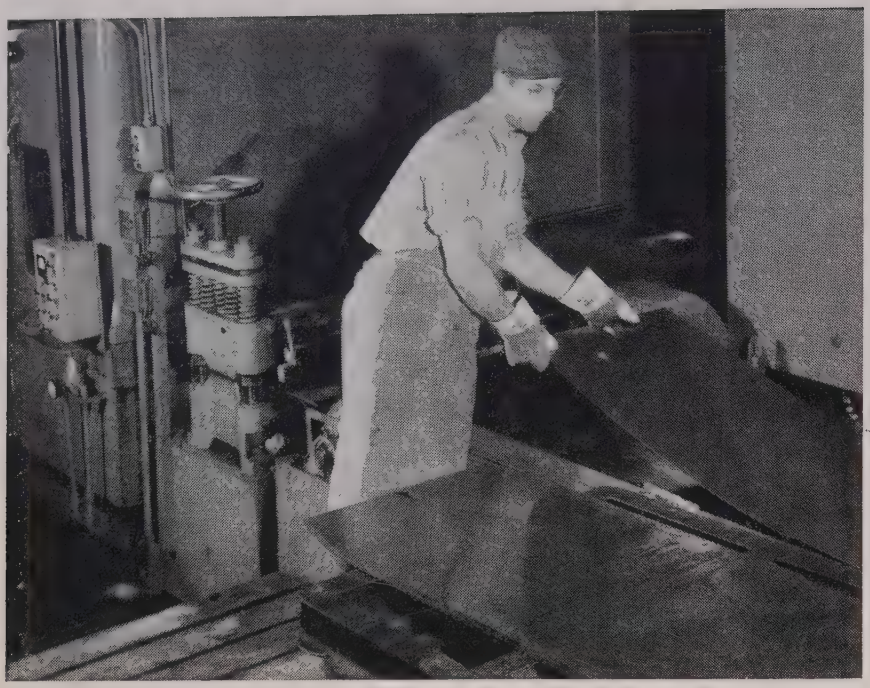

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is high. From the reading of the spring balance and measurement of the area of the base of the nodule, the adhesive force per unit area is computed.

180,000-hp Wind Tunnel Drive

National Advisory Committee for Aeronautics recently ordered a General Electric 180,000-hp wind tunnel drive—the greatest power output ever to be concentrated on a single shaft.

The giant electric motor unit and a companion 110,000-hp drive will be installed in two supersonic wind tunnels at NACA's Ames Aeronautical Laboratory, Moffett Field, Calif.

The 180,000-hp installation will be used to power a new, record-breaking eight-foot tunnel which will create wind velocities several times the speed of sound.

The drive will consist of four 45,000-hp, 720 rpm variable speed ac induction motors mounted in tandem on a single shaft to drive either of two axial-flow compressors.

Largest of their kind ever built! the motors will weigh more than 145 tons apiece and each will be the size of a small room. Rated at 180,000-hp the four-motor drive will have a peak one-hour output of 216,000-hp, according to GE engineers. The system will use slip-regulator control.

The second unit, rated at 110,000 hp, will be used at the Ames Laboratory's present 16-foot tunnel, replacing the 27,000-hp GE drive installed there a few years ago.

Using three propellers operating o

Rubber Lining Saves Steel Shell

PROTECTION against muriatic aci a by-product in the manufacture magnesium, is furnished by rubber li ing four huge steel tanks to be us in storing the acid. B. F. Goodri Co., is doing the job in Akron a has to truck the tanks to Diamo Magnesium Co.'s plant in Painesvil O., 62 miles away. The actual trip much longer because low bridges route don't have the 16-foot 8-in clearance required. Even the rou about route which takes 18 hours daytime travel requires the lifting telephone and trolley wires

Multiply effective time of maintenance men with this matched pair

How much time do your maintenance men spend lubricating motors—or servicing starters? It is valuable time which could be applied to other equipment. Take the case of a southern mill for example:

THEY THREW GREASE GUNS AWAY—and freed men for other important maintenance. Here's how. In this mill, 75 motors drive knitting machines. Formerly, they were lubricated weekly. Four years ago, Life-Line motors were installed. ALL have been operating four years—continuously 16 hours a day, 6 days a week. Yet, they *never* have been lubricated. There have been no outages.

Maintenance men carry only an oilcan for oiling knitting machines. Lubrication time has been cut in half, releasing them for time on other equipment to keep it in top running shape.

BUT THAT'S ONLY HALF OF THE STORY. Life-Linestarters® cut maintenance two more ways. They reduce motor burnouts through the positive protection afforded by the bimetallic disc. They require minimum servicing. Exclusive "De-ion®" grid confines, divides, and extinguishes arc—increasing contact life.

Together Westinghouse Life-Line motors and Life-Linestarters are your best defense against outages . . . your best bet to free maintenance men for other duties. Why not get the advantages of this matched pair?

Call your nearby Westinghouse representative for data on the complete line of Life-Line motors and starters. Ask for copies of "Life-Line Motor Book", B-3842, and "Tomorrow's Starter Today", B-4677. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21629

YOU CAN BE SURE.. IF IT'S

Westinghouse

Life-Line

MOTORS and CONTROLS

a single shaft, this tunnel will create wind velocities ranging from 350 to 920 mph.

This drive will be comprised of two 41,500-hp and one 27,000-hp variable speed ac induction motors. Combination slip-regulator and Clymer system speed control will be used.

The Clymer setup will consist of two motor-generator sets linked in for greater speed control and to provide easier starting without excessive drain on the power supply.

All equipment, from the 110-kv power lines to the compressor shafts will be furnished by General Electric.

High-Pressure Chemical Research at 150,000 PSI

"Hot ice," which exists at temperatures higher than the boiling point of water, was one of the exotic by-products of recent high-pressure research described by Dr. C. O. Strother, Linde Air Products Co., Tonawanda, N. Y., at a dinner of the American Chemical Society's western New York Section at which he received the 1951 Jacob F. Schoellkopf medal.

Commercial high-pressure chemical processes are now operated up to 50,000 psi as contrasted with the prewar limit of 15,000. However, high-pressure research described by Dr. Strother was conducted at pressures up to 150,000 psi, and the "hot ice," produced under the direction of Prof. P. W. Bridgman of Harvard University, was made at a pressure of 600,000 psi.

High pressures are important in chemical processes because, by bringing the molecules of substances closer together, they bring into play forces of attraction between the molecules that do not operate at the greater distances normally prevailing. Polyethylene plastic can be produced from ethylene gas only by the use of high pressures for this reason, according to Dr. Strother.

He added that he had developed a pump which operates rather well somewhat above 100,000 psi pressures, but there are very few materials outside of the permanent gases that remain sufficiently fluid to be pumped at such pressures.

Because of the influence of high pressure on chemical reactions and the profound effects it has on the form in which matter exists, high-pressure work is important in scientific research aimed at understanding the structure of matter and the nature of chemical processes.

Plexiglas Engine Built

Unusual craftsmanship in plastics is represented in the visual study model of a four-cylinder gasoline engine made of acrylic plastic by Philip A. Derham & Associates, design engineers of Rosemont, Pa. The assembly, designed and fabricated to illustrate the close tolerances which could be held and the perfect visibility of working parts attainable in industrial models with this transparent material, measures about 8 inches long, 6 inches deep and 4½ inches wide. Block, cylinder head, crankcase, flywheel and motor mounts were machined from solid clear Plexiglas. The timing gear cover was heat-formed from ⅛-inch thick sheet of the same material.

Bore is 1.218 inches, stroke is 1.125 inches, giving a piston displacement of 5.24 cubic inches and an A.M.A. rating of 2.2 hp. Compression ratio at 3.7:1 was deliberately held low to facilitate spinning the motor by hand or by a belt drive to an external flywheel from a small electric motor.

Pistons, wrist pins, connecting rods and valves are machined from aluminum. Rings are aluminum, and are designed to give a minimum of scraping action. Valve springs are hand

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Bellmouth for testing jet engines spun and fabricated of stainless steel.

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AIR AND HYDRAULIC
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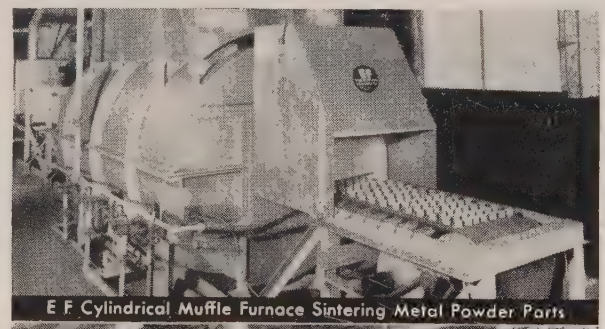
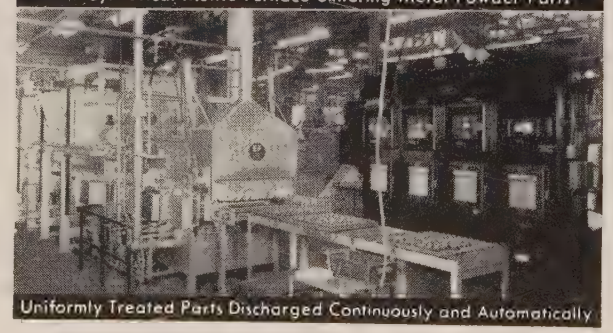


E F Cylindrical Muffle Furnace Sintering Metal Powder Parts



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● EF furnaces are built in many sizes and types for sintering a wide variety of ferrous and non-ferrous pressed metal powder products — for bonding metal powder to strip, and other processes.

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wound from steel wire. Brass is used for the crank shaft, cam shaft and their main bearings. Polyethylene cams are used; rod bearings are aluminum, and the timing gears brass and steel. Spark plugs are those made for model airplane engines.

Cylinder bores were drilled then cleaned out with a boring bar operated at slow speed, with kerosene used as both a coolant and cutting oil. The slight tool marks remaining were removed with a flexible shaft buffer and medium cut buffing compound. Final polishing of cylinder walls and other machined surfaces was done with white chalk.

Safety Contest Scheduled

Continuing improvement in steel foundry safety practices is anticipated as the direct outgrowth of the 1951 national safety contest sponsored by Steel Founders' Society of America, according to F. Kermit Donaldson, executive vice president of the national technical organization.

Open to more than 150 member steel foundries, the competition will be conducted during the months of June, July and August, a quarterly period during which precedent indicates accident frequency rates tend to be high.

Rules of the American Standards Association will be used to determine lost-time injury rates for the participating foundries. Awards will be based on statistical results of monthly reports filed with the society under rules and procedures formulated by its National Safety Committee. Frequency rates developed from the monthly reports will provide the basis on which national contest winners are to be determined.

For purposes of the competition, steel casting industry member foundries will be divided into four groups based on the number of man-hours of exposure per month, as developed from analysis of lost-time injury reports for the 1950 contest period. For participation, however, the minimum monthly man-hours of exposure must be equal to at least 50 per cent of the average man-hours of exposure during the first five months of 1951.

Circuit Breaker Information

Heinemann Electric Co., Trenton, N. J., has condensed its complete catalog into 12 pages and it is ready for distribution to product designers, laboratory development technicians and construction engineers, and anyone interested in small air circuit breakers.

For use as quick reference material and guide, this new publication

gives information on the complete line of fully magnetic, nonthermal circuit breakers for general use, auxiliary circuit protection, panelboard applications and aircraft designs.

Cartridge Cleaning Speeded Up

A process which cleans steel cartridge cases 50 per cent faster than conventional methods is announced by B. F. Goodrich Co., Akron. Cleaning is one of the important steps in the manufacture of shells for the Ordnance Corp.

The new system is the defense version of a continuous process for cleaning and pickling steel. Known as the B. F. Goodrich-Curran automatic spray pickling machine, it is used commercially to mass produce such metal articles as bath tubs, refrigerator liners, panels for electric and gas stoves, fluorescent light reflectors and automatic washing machine liners and tubs.

Development of the new process is especially significant at this time because, due to the critical copper supply, most of our larger caliber ammunition produced in the future will be made with steel cases rather than brass. Equipment needed for the new process is lined with rubber which withstands the highly corrosive action of the pickling acids used.

Corrosion Prevention Discussed

Need to guard against corrosion in power plant equipment during standby periods was stressed at the National Association of Corrosion Engineers meeting in New York. Hall Laboratories spokesmen added that corrosion prevention was usually more difficult when the equipment was idle than when it was in normal operation. This is because, during operation, oxygen in the feedwater is reduced to very low levels by means of adequate mechanical deaerating equipment. As secondary protection, sodium sulphite is generally employed for chemical removal of traces of oxygen that may remain.

But when a boiler is taken off the line to be placed in standby, operators frequently leave water in the unit so that it will be ready for operation again on short notice. This practice is especially dangerous from a corrosion standpoint if proper precautions are not followed. As the boiler cools, internal pressure drops, creating a partial vacuum. All spaces normally occupied by steam then become filled with air. Metal exposed to the moist atmosphere in these regions is extremely vulnerable to corrosive attack stimulated by oxygen and carbon dioxide.

Under prolonged standby condi-

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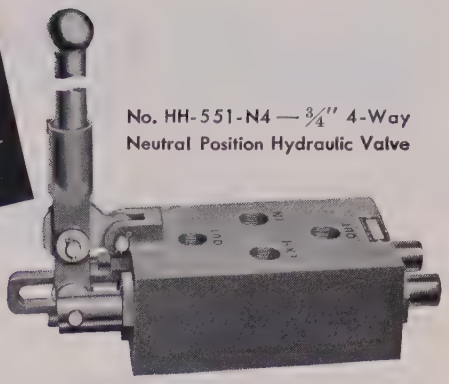

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For water or oil hydraulic systems to 5000 p. s. i.

● Unsurpassed for efficient trouble-free service controlling double acting hydraulic cylinders and other important high pressure hydraulic circuits. Positive, fast acting. All parts are in pressure balance, eliminating any tendency to creep or crawl. Machined steel housing, chrome plated and polished stainless steel plungers. Self sealing U-packers. Metal valving rings take the impingement of the liquid, preventing wear on the packings. ½" to 1½" sizes. Available also in pilot operated designs up to 4". *Write for full details.*

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16 pieces of rear axle housings are Gerrard-strapped into conveniently handled pallets. (Photo courtesy of International Harvester Company, Industrial Power Division.)

Gerrard-Strapped more **PALLETS SAVE MONEY!**

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The Gerrard Method of Strapping requires no extra seals or clips. Every Gerrard machine tensions the strapping, forms its own twisted seal, trimmed smooth with no exposed ends. Once tensioned and tied, Gerrard Steel Straps keep a tight, firm grip until they reach their destination.

Gerrard Steel Strapping costs about 40% less than any other metal reinforcement. And there's a size of Gerrard Strap to fit every tying need.

A Gerrard engineer will gladly explain how the use of Gerrard Steel Strapping can save you money. His advice on packaging problems is free. Write for further information and a free copy of the *Blue Book of Packaging.*

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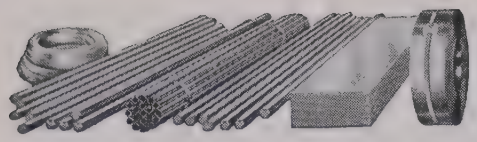
UNITED STATES STEEL



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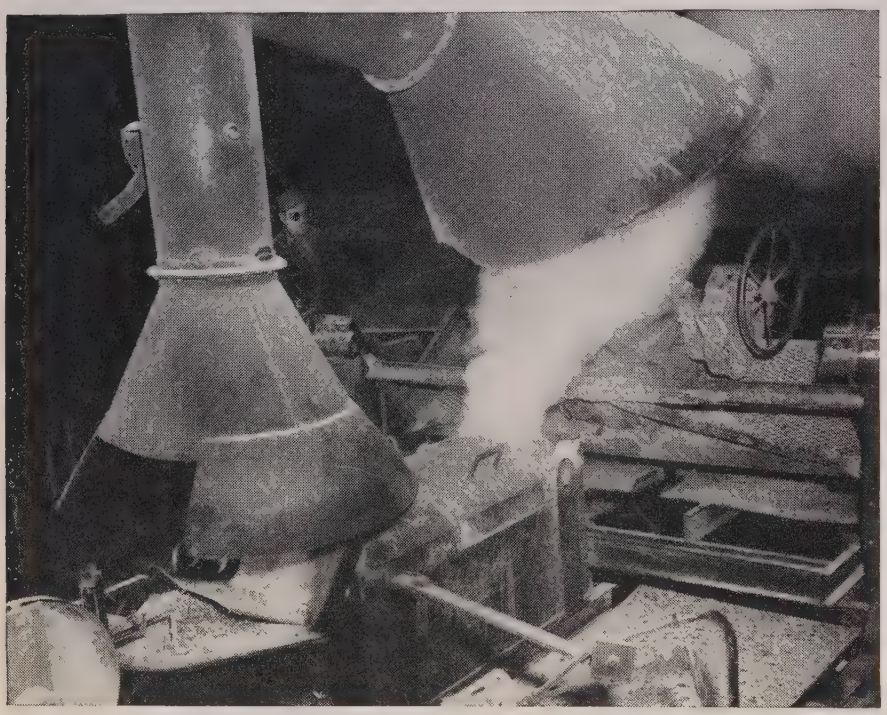


Continuous Casting of Brass at Bridgeport Brass Co., Bridgeport, Conn.

Brass Scrap Situation and Its Effect on Brass Production

Copper and zinc, essential metals for both military and civilian needs, have been in short supply for many months and the situation has been growing worse. After taking care of the mounting volume of DO orders, there is not enough remaining to take care of civilian needs even at the reduced allotment.

As far as we can learn, there has not been a sufficient increase in the production of copper and zinc to satisfy this unprecedented demand and to take care of the requirement of the government stock piling, defense and foreign rearmament programs.

The high volume of production of brass mill products during 1950 and the early part of 1951, has been possible only because the mills have dipped into their metal inventories which are at their lowest ebb today.

From the brass mill standpoint, the short supply of zinc has been critical because it is needed for alloying with copper to produce brass. Zinc acts as a means of stretching the available supply of copper because when alloyed with 100 pounds of copper it can result in about 145 pounds of brass. This increased tonnage will serve a larger number of users.

However, to augment the supply of zinc and copper, the brass mills use clean brass scrap, viz., clippings, rod ends, and shavings generated during metal goods fabrication. The scrap is added to the melt with new metal and is eventually turned into new mill products.

It has always been the custom for the brass mills to buy back the brass scrap from their mill products, customers and metal dealers at definite published prices which reflect the prevailing prices of new copper and new zinc.

Today, because of the voracious demand for brass scrap, its price has been raised considerably beyond that of virgin metal. As a result, a portion of this scrap, which would ordinarily be returned to the brass mills, has been diverted to other channels.

The serious shortage of copper and zinc, plus the insufficient brass scraps being returned to the mills explains in part why the brass mills are operating on a reduced schedule and are not able to fill the many orders which have piled up.

Some Scrap Diverted

The scrap situation can be improved if metal goods manufacturers will make sure that *all* their scrap is returned to the brass mills. Although most manufacturers make it a practice to do so, there are some smaller ones who think that their scrap generation is insufficient to count. However, when the scrap generation of all small manufacturers are added up, the total becomes worthwhile.

It is true that in some cases brass scrap can fetch higher prices than that offered by the brass mills. Unfortunately, if this scrap does not find its way back to the brass mills, the brass mill tonnage is reduced and all brass users suffer.

How Brass Users Can Help

Here are a few suggestions which, if followed by metal goods manufacturers, would help the scrap situation considerably.

1. Store all scrap in clean containers, keeping it separated by alloy and properly identified.
2. When a sufficient quantity has been collected, notify the brass mill for whom it is intended. Give details as to weight, alloy, character of scrap. Ask the brass mill to collect it either in their own trucks or to designate the particular scrap dealer which does this work for the brass mill.
3. If you know where there are clippings of zinc resulting from manufacturers' cups or stampings, or scrap copper wire or other forms of good clean scrap of brass, bronze or copper not generated by brass goods manufacturers, please notify your supplier of brass mill products. (6867)

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

Dezincification (Cont'd)

It is clearly evident that certain deposits of either corrosion products or porous materials may set up corrosion cells which initiate dezincification in brass. Therefore, whatever steps can be taken to prevent such deposits from attaching themselves to the metal surface will help reduce dezincification. It should be recognized from the outset that these porous deposits do not need to be any larger in diameter than the point of a pin.

At least five methods have been used to retard dezincification; namely—

1. Mechanical cleaning.
2. Chemical cleaning.
3. High velocity or turbulent flow.
4. Formation of protective coatings.
5. Use of inhibited alloys — arsenical Admiralty or arsenical aluminum brass.

Effect of Silt

Muntz metal, non-inhibited Admiralty and non-inhibited aluminum brass condenser tubing, kept clean by the scouring action of small amounts of sand and certain types of fine silt entrained in the circulating water, or by chlorination and frequent brushing, have corroded at low rates (generally .001 ipy or less).

Yellow brass and Muntz metal piping and tubing kept free from various deposits have given very long service.

Effect of Turbulence

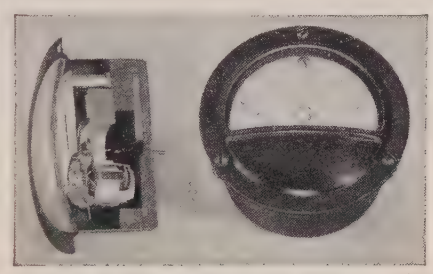
The high degree of turbulence found at the entrance end of brass condenser tubes has been observed as being very effective in preventing dezincification for a distance of a few inches up to two feet. Under very turbulent conditions dezincification has virtually been completely prevented along the entire length of such tubes. Where the turbulent condition exists at the entrance end only, non-inhibited brass alloys may be subject to slow attack about .002 ipy along the remainder of the tube length. However, it must be remembered that high turbulence is often associated with impingement corrosion. Here impingement-resistant alloys such as aluminum brass, aluminum bronze and cupro nickel serve best.

It has also been observed that propellers cast from high strength brasses, which have been in constant service in sea water for many years, have shown virtually no dezincification although there may be some evidence of erosion and cavitation. On the other hand, idle propellers may be subject to rapid dezincification.

Brass Plays Important Role in Electrical Instruments

The physical properties of brass are utilized in many parts of new shockproof measuring devices developed for the Signal Corps. Experience with many devices during the last war indicated that they were unable to withstand the shock of gunfire and underwater explosions, the intense vibration of jeeps, aircraft, other motorized equipment, and the other abuses to which portable field equipment is subjected.

Brass, being non-magnetic, does not affect the accuracy of the instruments. At the same time, since such devices are exposed to all sorts of adverse weather and moisture conditions, corrosion resistant properties of copper-base alloys are vital. This is particularly true of the instruments used by the armed forces, since little protection from the elements can be afforded equipment in the field.



Rubber shock mounted meters manufactured by Marion Electrical Instrument Company, Manchester, New Hampshire.

Important from a manufacturing standpoint is the ease of machining, stamping and finishing of brass and bronze. Most of the parts, such as the dial pan and magnet retaining plate, are stamped. Others are easily produced on screw machines.

Four parts—three washers and the solder lug — are made of phosphor bronze. This alloy is used because of its excellent spring properties, fatigue and corrosion resistance.

Completely Redesigned for War Use

Study of instruments which failed to measure up to the rigid demands of war service revealed two vital requirements. The first was the development of a rubber shock mount for the instrument, and the other was a redesign of all elements, including the basic D'Arsonval movement.

After much research and testing, a rubber compound was developed with the necessary temperature and dielectric characteristics which would also bond directly to the case and protect the instrument itself by absorbing external shock.

Other improvements include, a brass magnet retaining plate permitting distribution of shock forces over the largest possible surface of the magnet.

Beryllium copper is used for hairsprings because of its non-magnetic properties and good spring qualities.

The meters, which are hermetically sealed to exclude moisture are used by all branches of the armed services.

Brass and other copper-base alloys have always been used in the production of electrical instruments. Our laboratory welcomes the opportunity to help with your metal problems.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Hydraulic Indicator checks within two-tenths of a thousandth on a 24-inch vertical length, giving visual inspection. The instrument can be used in checking jig grinders, jig borers, surface grinders, angle plates, milling machines and other fixtures and dies. **No. 1150**

Electric Drill is said to withstand very rough service. The ½" capacity unit has a no-load speed of 550 rpm, operating on a-c or d-c at 115 v, 60 cy. A special 220 v unit can be furnished. A 2-pole switch provides momentary contact and a lock is provided for continuous operation. **No. 1151**

Metal Fastener, locked by thumb pressure, allows rapid assembly and disassembly. Designed to replace screws or bolts occasionally removed for service or inspection, the unit is installed from one side of a 3/16" hole. Thumb pressure locks the fastener, and it can be removed with a screw driver or thumb nail. **No. 1152**

Portable Stroboscope has a basic speed range from 660 to 14,400 cycles or revolutions per minute. The light-flashing unit operates on 110 v, 50 or 60 cy a-c. Range can be extended to 100,000 rpm by using multiples of the flashing speeds, and below 600 by checking multiple images. Accuracy is said to be plus or minus 1% of the dial reading above 900 rpm. **No. 1153**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL

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tions, prevention of such corrosion requires elimination of either moisture or oxygen. In the first case, a boiler must be emptied, dried out and kept dry; in the latter, it must be filled completely with properly treated water and kept filled.

When the dry method is employed, great care must be taken to keep all surfaces thoroughly dry. This is especially difficult with superheaters of the nondrainable type, because condensate tends to collect in the lower bends, promoting rapid attack, even though the boiler proper remains in good condition.

The wet method gives good protection when: Correct chemical conditions are maintained in the water with which the boilers are filled, mixing of water in the boilers is satisfactory so that fairly uniform concentrations are obtained, and boilers are completely filled so that no inner surfaces are in contact with air.

To protect turbines, the speakers recommended double valving all steam connections to and from the turbine, with tell-tales between the double valves as a check on leakage. Warm air should also be blown through the unit continuously to maintain a temperature above the dew point.

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CALENDAR OF MEETINGS

† *Denotes first listing in this column.*

June 10-13 & 13-16, National Metal Trades Association: Annual western plant management conferences, Dell View Hotel, Lake Delton, Wis. Association address: 122 S. Michigan Ave., Chicago 3.

June 11-13, American Supply & Machinery Manufacturers Association Inc.: Industrial supply convention, San Francisco. Association address: 1346 Connecticut Ave. N.W., Washington 6.

June 11-13, Symposium — "Analysis and Metallography of Titanium": Illinois Institute of Technology, sponsor, Sheraton Hotel, Chicago. Institute address: Technology Center, Chicago 16.

June 11-13, Electric Metal Makers Guild Inc.: Annual meeting, Seignoiry Club, Montebello, Que. Guild address: Box 6026, Washington Station, Pittsburgh 11.

June 11-14, American Society of Mechanical Engineers: Semi-annual meeting, Royal York Hotel, Windsor, Ont. Society address: 29 W. 39th St., New York 18.

June 11-14, American Boiler Manufacturers Association & Affiliated Industries: Annual meeting, Skytop Lodge, Skytop, Pa. Association address: 613 Perry Payne Bldg., Cleveland 13.

†**June 11-16, National Committee on Theoretical & Applied Mechanics:** National congress, Illinois Institute of Technology, Chicago. Address: L. H. Donnell, Technology Center, Chicago 16.

June 13-15, Southeastern Conference on Industrial Organic Finishing: Bristol, Tenn.-Va., Foreman's Club, sponsor, Senior High School, Bristol, Tenn. Conference address: R. K. Cooper, Monroe Calculating Machine Co., Box 191, Bristol, Va.

June 15, The Wire Association: Pacific Coast regional meeting, Sir Francis Drake Hotel, San Francisco. Association address: 300 Main St., Stamford, Conn.

June 15, Eastern States Blast Furnace & Coke Oven Association: Annual spring meeting. Edgewood Country Club, Pittsburgh.

June 15-30, Seattle International Japanese Trade Fair: Edmundson Pavilion, Seattle. Address: Port of Seattle, Box 1878, Seattle 11.

†**June 16, American Home Laundry Manufacturers Association:** Summer meeting, Hotel Morrison, Chicago. Association address: 38 S. Dearborn St., Chicago.

June 17-20, National Metal Trades Association: Eastern plant management conference. Mayflower Hotel, Plymouth, Mass. Association address: 122 S. Michigan Ave., Chicago 3.

June 18-22, American Society for Testing Materials: Annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Society address: 1916 Race St., Philadelphia 3.

†**June 20, American Society for Testing Materials:** Chemical analysis of inorganic solids by means of the mass spectrometer. Chalfonte-Haddon Hall, Atlantic City, N. J. Society address: 1916 Race St., Philadelphia 3.

June 22-23, Malleable Founders Society: Annual meeting, The Homestead, Hot Springs, Va. Society address: 1800 Union Commerce Bldg., Cleveland.

June 24-26, Alloy Castings Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute address: 32 Third Ave., Mineola, N. Y.

June 24-27, National Association of Cost Accountants: Annual international cost conference, Palmer House, Chicago. Association address: 505 Park Ave., New York 22.

June 25-29, American Institute of Electrical Engineers: General summer meeting, Royal York Hotel, Windsor, Ont. Institute address: 33 W. 39th St., New York 18.

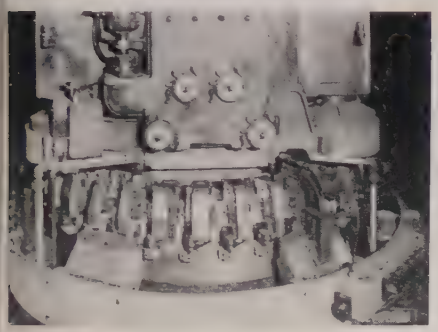
June 25-29, American Society of Mechanical Engineers: Annual conference & exhibit, Oil and Gas Power Division, Baker Hotel, Dallas. Society address: 29 W. 39th St., New York 19.

New Products and Equipment

Special Grinding Fixture

Mattison Machine Works, Rockford, Ill., has completed a specially equipped No. 72 four spindle Mattison (Hanchett type) rotary surface grinder for finishing the body and cover of automotive oil pumps. Workpieces are held in automatic clamping fixtures as shown in the illustration.

A safety device is provided which stops the table in case the operator

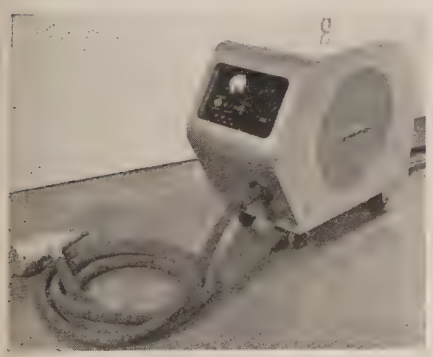


doesn't locate the work properly in the fixture. Automatic sizers are constantly in operation checking the work and keeping all of the pieces within the specified tolerances without the operator's attention.

Check No. 1 on Reply Card for more Details

Portable Unionmelt Welder

A portable semiautomatic manual machine for Unionmelt welding short seams is announced by Linde Air Products Co. division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. The UWM-1 can be used on work which cannot



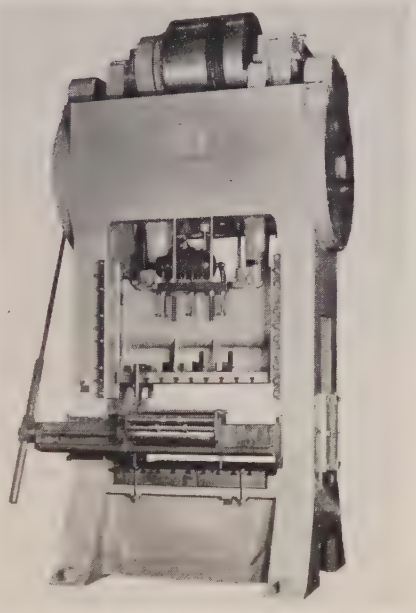
be welded conveniently with fully automatic machines and is suitable for small shops that have no automatic welding machine.

Parts of the machine which include the welding head, a voltage control box and a 75-pound capacity spoke-type rod reel, are mounted on a small steel chassis complete with casters and a lifting eye. A 17-foot flexible hose connects the hand unit to the welding unit. A lightweight hopper holding 3 pounds of granular welding composition is part of the hand unit. The low-voltage rod feed motor and the series-type motor voltage control have few parts and require minimum adjustment. The control automatically maintains constant welding voltage even though the welding operator does not hold the hand unit at a uniform distance from the work.

Check No. 2 on Reply Card for more Details

Two Point Press

Cleveland Punch & Shear Works Co., Cleveland 14, O., is building a two point press that is double



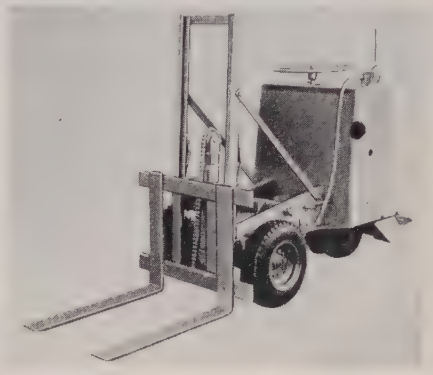
geared, twin drive and equipped with an electrically controlled, air operated, drum type friction clutch with spring loaded brake and arranged with air counter balance to the slide. Flywheel is equipped with an auxiliary air brake to bring it to a quick stop and the slide is power adjusted. It is also arranged with a single roll feed and provided with pneumatic cushion in the bed which has a capacity of 50 tons at 80 psi, 6-inch travel.

Model No. 2S-300-60-42 (illustrated) has a stroke of 12 inches, adjustment of slide of 8 inches, distance bed to slide stroke down and adjustment up of 42 inches, area of bed 48 x 60 inches, area of slide 42 x 60 inches. It operates at 22 rpm and has a capacity of 300 tons. Press can be furnished in a wide range of sizes and capacities.

Check No. 3 on Reply Card for more Details

Power Fork Lift

A power-driven fork lift attachment for the Moto-Bug power wheelbarrow is added by the Kwik-Mix Co., Port Washington, Wis., a subsidiary of Koehring Co. It has a 1000-pound



lift capacity and raises the load to a maximum height of 30 inches.

To assure a better load balance, forks tilt to the rear when being raised and are adjustable to a maximum width of 33 inches. Standard forks are 20 inches long and 30-inch forks are optional. Direct steering to dual rear wheels allows machine to turn in its own length. A 4-hp gasoline engine furnishes power for both forward and reverse travel and lifting loads.

Check No. 4 on Reply Card for more Details

Improved Dumping Trailer

Improvements in type TP trailers made by Easton Car & Construction Co., Easton, Pa., provide 12 per cent

increase in capacity with no increase in overall dimensions as compared with the previous model. They are available in 14, 17 and 20-ton capacities. Load distribution is improved to place more load on the fifth wheel

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Grand Rapids, Michigan

With press time at a premium and schedules pushing capacity to the limit, the advantages of Danly Press construction and engineering features are more important than ever. At Jarecki, the full-rated die capacity and extra slide rigidity of Danly Presses made possible production of the parts shown above in pairs—two at a stroke!

Danly Presses are built with machine tool precision, built to withstand the punishment of round-the-clock operation. Write today for the unusually complete Danly Straight Side Press Catalog. See how Danly Presses will help you meet production schedules.

DOUBLE DIE TOOLING used throughout th line is shown in this close-up view. Extra a cision gibs contain the entire slide at all tim the working stroke, providing the extra i make this "double-production" set-up possi

STRAIGHT LINE ARRANGEMENT of the Danly P makes material handling fast and easy . . . a uninterrupted press operation a *must*. Danl like complete pressure lubrication and "pre controls assure minimum press down time

Straight Side Autofeed Gap Frame Double Action Underdrive

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IS PER HOUR—The extra capacity and
f Danly Presses permit flexibility of die
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th two sets of dies to stamp these auto-
ont door hinge pillars two at a time.

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rmed on the lead 300-ton Danly Double Action
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press has not required any unscheduled down
time for emergency maintenance.

FOR YOUR COPY TODAY!

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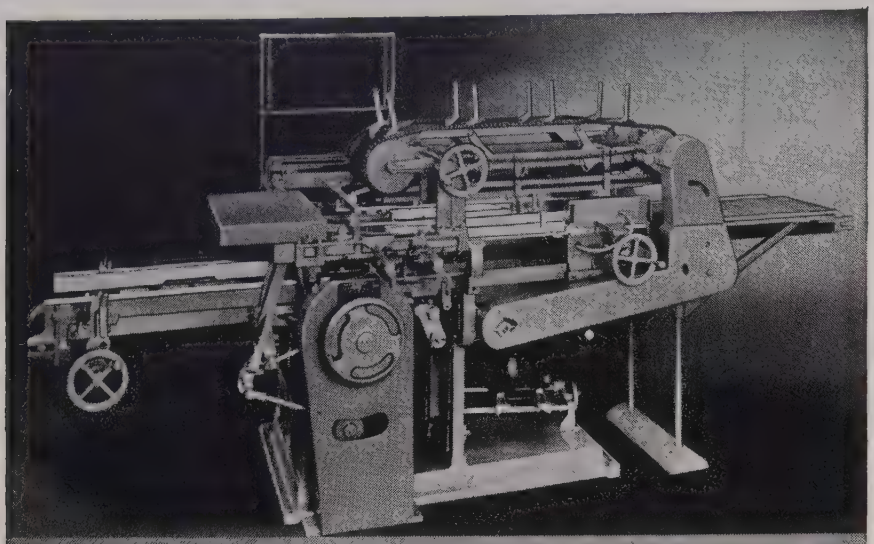

Model FA Wrapping Machine, made by **PACKAGE MACHINERY COMPANY**, Springfield, Mass.

– they say:

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"We have found LUBRIPLATE Lubricants to be very effective and use them extensively in our machines."

"To assure the proper use of LUBRIPLATE Lubricants for re-lubrication, we place tags on our machines before shipment. Thus the purchasers of those machines know the LUBRIPLATE Product we recommend for each application and where to obtain it."

The Package Machinery Company of Springfield, Massachusetts is among the earliest users of LUBRIPLATE Lubricants. They use them for original lubrications because LUBRIPLATE Lubricants arrest progressive wear and add longer life to moving parts. They recommend them for re-lubrication to preserve the efficiency of the machines, to reduce power costs and minimize service work and parts replacement.

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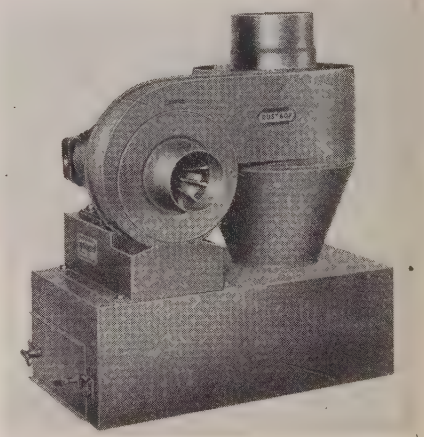
thus providing better traction on the tractor axle. Trailer is furnished as a complete unit with a permanently coupled, rubber mounted fifth wheel.

Doorless pan-type trailers may be dumped from either side. Body may be reversed from end to end to prevent excess wear on one side. Unit is furnished with one bolt attached stabilizer arm, interchangeable from side to side depending upon the direction of dumping.

Check No. 5 on Reply Card for more Details

Cleaner Plant Air

Model 4N20 dust collector, the smallest in the line of out-of-doors exhaust type units made by Aget-Detroit Co., 139 Maine St., Ann Arbor, Mich., is intended for use where remotely located dust sources have toxic fumes, vapors or obnoxious odors. Developing a rated 437 cfm and 5000 fpm velocity at the inlet, its



suction is adequate to handle a buffing, polishing or grinding wheel up to 10-inch diameter or two wheels for similar work from 3 to 7 inches in diameter.

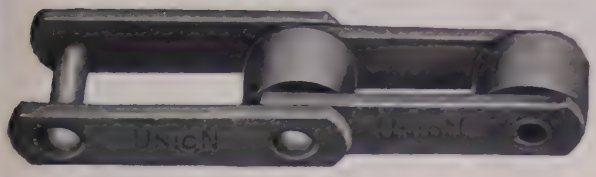
The self-contained unit is powered by a ⅓-hp, 3600 rpm continuous duty motor direct driving a self-clearing paddle wheel type fan. Foreign material is removed from the air stream in the cyclone separator and the toxic odors, fumes and extremely fine dust are exhausted to the out-of-doors.

Check No. 6 on Reply Card for more Details

Broad Heating Range

A combination hardening and tempering furnace No. 869 with an Infitrol and electronic controller made by K. H. Huppert Co., 6830-32 Cottage Grove Ave., Chicago 37, Ill., gives automatic control of temperatures ranging from 300 to 2200° F. Furnace is 8 inches wide, 6 inches high and 9 inches deep with maximum current consumption of 4

TYPICAL UNION DRIVE AND CONVEYING CHAINS



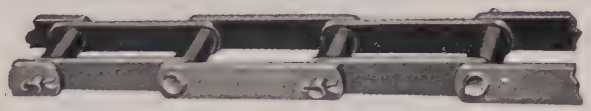
HB STRAIGHT SIDE BAR ROLLER CHAIN

BRIDGE CHAIN

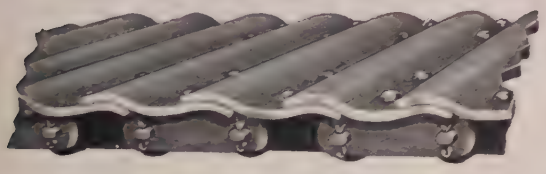
BP CHAIN

BP ICE CHAIN

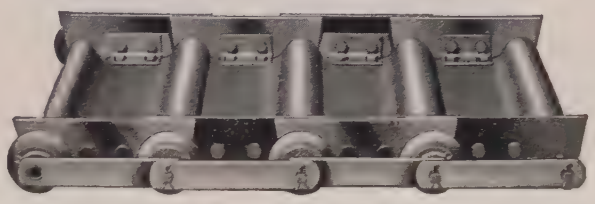
HB STRAIGHT SIDE BAR BUSHING CHAIN



COMBINATION MALLEABLE IRON AND STEEL CHAIN



APRON CONVEYOR STYLE A



APRON CONVEYOR STYLE B

UNION CHAIN REPRESENTATIVES

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American Chain & Gear Co.
C. A. Nicholas
5511 Pacific Blvd.
Huntington Park, Calif.

GEORGIA
H. F. Edge
208 Walton Bldg.
Atlanta, Georgia

ILLINOIS
Union Chain & Mfg. Co.
W. Albrecht
A. C. Mahr
B Nelson
Room 1232
53 W. Jackson Blvd.
Chicago, Illinois

INDIANA
Paul W. Huddlestun
5745 Guilford Ave.
Indianapolis 20, Indiana

LOUISIANA
F. N. Johnston Co.
2207 American Bank Bldg.
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MASSACHUSETTS
Transmission Engineering Co.
Stanley Johnson
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Newton Highlands 61, Mass.

MICHIGAN
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Basso Bldg
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St. Paul, Minn.

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Syracuse, New York

Mays & Gleason, Inc.
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New York 7, New York

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29 Wilkeson St.
Buffalo, New York

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P. O. Box 3341
Charlotte 3, N. Carolina

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3330 Montgomery Rd.
Cincinnati 7, Ohio

Union Chain & Mfg. Co.
F. H. Dalrymple
F. Smiley
Marshall Bldg
Cleveland 13, Ohio

OREGON
J. W. Minder Chain & Gear Co.
307 S. E. Hawthorne Blvd.
Portland 14, Oregon

PENNSYLVANIA
David Davies
P. O. Box 4
Plymouth, Pa.

F. R. Magill Company
44 McKnight St
Pittsburgh 20, Pa

Union Chain & Mfg. Co.
John A. Shoemaker
Room 521
Schaff Bldg
Philadelphia 2, Pa

TEXAS
Union Chain & Mfg. Co.
J. H. Castleberry
E. T. Teal
205 Irwin-Keasler Bldg.
Dallas 1, Texas

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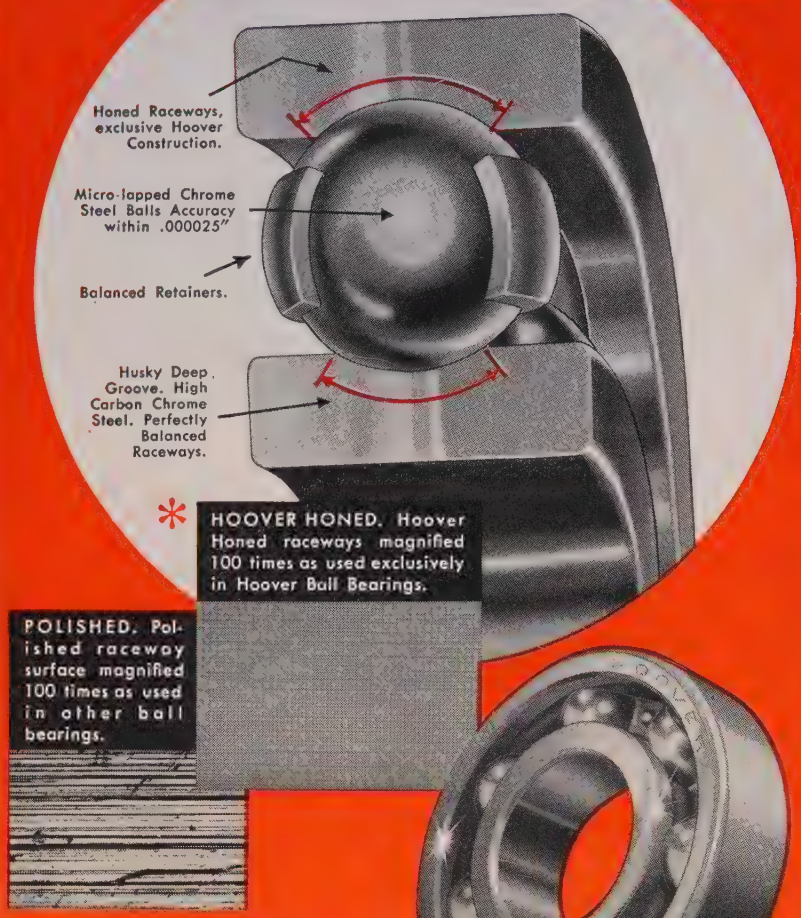
Honed Raceways, exclusive Hoover Construction.
Micro-lapped Chrome Steel Balls Accuracy within .000025"
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Husky Deep Groove. High Carbon Chrome Steel. Perfectly Balanced Raceways.
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90% longer life
30% greater load
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The Aristocrat of Bearings

HOOVER BALL AND BEARING CO.
Ann Arbor, Michigan

kw. It is wired for 220 v, single phase operation. A counterweighted door rides in a wedge slide to seal the door in the closed position. All contacts are fully enclosed and the furnace is shipped ready for operation.

It is built as a floor model or as a bench model to meet users' require-

ments. It is also available as a model using the Infitrol and an indicating pyrometer only. In this case the low temperature range is raised to 1000° F in place of the 300° F possible with the complete unit.

Check No. 7 on Reply Card for more Details

Light Truck Redesigned

A redesigned line of light capacity electric fork lift trucks in capacities up to 2000 pounds is available from Yale & Towne Mfg. Co., Philadelphia Division, 11000 Roosevelt Blvd., Philadelphia 15, Pa. They are designed to

fill the needs of companies desiring the advantages of sit-down operation, combined with a short wheelbase and maneuverability.

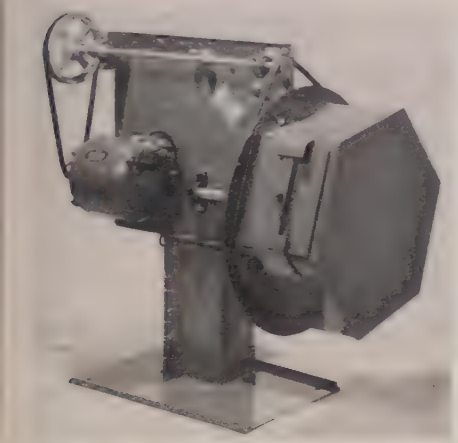
Automotive-type controls mean easier operator training and less fatigue on long shifts. Magnetic control on the truck prevents careless

driver from imposing unnecessarily severe loads on the motor. A time delay between speeds provides a smooth uniform acceleration preventing jackrabbit starts that might shift and damage loads. A nonplugging device on the electric controller prevents reversal of power in any but first speeds.

Check No. 8 on Reply Card for more Details

Attachable Burring Barrel

A burring barrel for attachment to the tumbler mixer is announced by Rampe Mfg. Co., 3320 St. Clair Ave., Cleveland 14, O. This accessory is constructed of 14 gage steel, electrically welded watertight and has a gasketed cover attached with one screw. Maximum diameter is 17



inches and height is 6¾ inches, giving a total volume of five gallons. Attachment to the basic machine is by four machine bolts.

In operation the parts to be deburred are placed in the barrel with abrasive grains and water. Rolling action causes the grains to grind away burrs on the enclosed metal parts. Equipment is large enough to do a satisfactory job on 50 pounds of materials.

Check No. 9 on Reply Card for more Details

Bench Model Wet Blaster

A bench model wet blaster called the Cro-Hone Jr. made by the Cro-Plate Co. Inc., 747 Windsor St., Hartford, Conn., puts a high luster finish on all types of metal parts and tools. It is designed to offer a surgically clean base for plating or painting and uses a fine abrasive suspended in a water carrier which is forced against metal parts by air pressure through a siphon jet gun.

Constructed of stainless steel, the unit has no moving parts or circulating pumps. In operation parts to be finished are inserted through the front

whether your product must be finished for corrosion resistance or paint adherence, or with eye-appealing brightness or in a variety of attractive colors, ... there's an IRIDITE to do the job!

Zinc, cadmium, aluminum, copper, brass or bronze, in their usual commercial forms, can be finished with Iridite for a fraction of a cent per square foot . . . and without costly special equipment or personnel training. In addition, our ARP plating chemicals . . . brighteners, addition agents, etc. . . . can increase the efficiency of your plating solutions prior to Iridite treatment.

Let the experience of our field engineers and laboratory specialists be your guide to the solution of your specific finishing problem.

We'll welcome the opportunity to work with you in the development of new materials as new finishing problems arise from your manufacturing plans. *Write for information, or send samples of your product for free test processing.*

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Many of our customers have already invested in the equipment needed to handle your aluminum forming subcontracts. They are seeking defense business. They offer knowledge gained from years of making aluminum products of their own. We recommend them because we helped many of them take their first light metal steps—and served all of them as they learned their aluminum skills.

If you are a prime contractor in aluminum, many of your defense orders may require presswork. Forming, stamping, coining, embossing, drawing, shearing and stretch forming are familiar operations to these companies.

An inquiry to your nearest Alcoa Sales Office will bring prompt action. Write or phone regarding your requirements, so we can tell you about the companies whose locations can best serve your needs. ALUMINUM COMPANY OF AMERICA, 2171F Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA

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A business built on Co-operation

Stretch forming, shown here, is an inexpensive method of forming parts not requiring sharp radii. This process eliminates costly dies and presses—is extensively used in the aircraft industry.

Aluminum is adaptable to all kinds of presswork (blanking, piercing, drawing, embossing, coining and stamping). Aluminum discs are being blanked here for subsequent forming operations.

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ROCHESTER 4, N. Y.	1331 Lincoln Alliance Bank Building
ST. LOUIS 8, MO.	10th Floor, Continental Building
SAN FRANCISCO 4, CALIF.	615 Russ Building
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SOUTH BEND 5, IND.	805 J.M.S. Building
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SYRACUSE 2, N. Y.	408 State Tower Building
TAMPA 2, FLA.	1004 Tampa Theater Building
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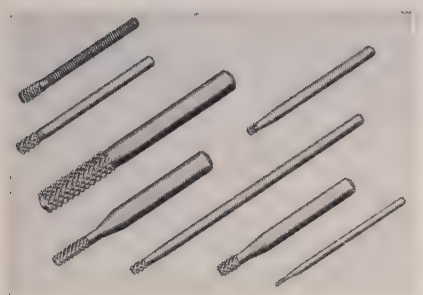

Special equipment and volume production enable us to save for you on a wide variety of precision parts made to order.

Typical are mandrels or spindles for mounted grinding wheels, abrasive points, felt wheels. Shank diameters to .500", close tolerances, centerless ground if desired. Chuck ends rounded, no burrs. Sharp, clear uniform knurls. Concentric tapers. Mandrels accurately hand-straightened.

We are also set up to make for you such parts as special rollers, studs, dowel pins, screw driver and ice pick blades, surgical and dental instruments, pen and pencil barrels, instrument shafts and pivots, special needles, etc.

Send your prints and specifications today for a prompt quotation.

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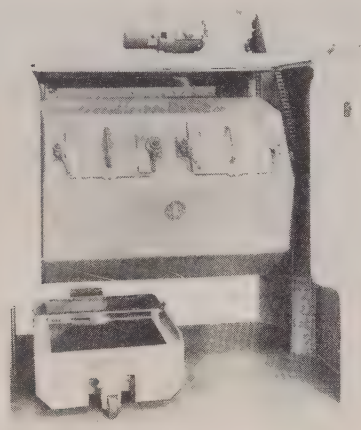
Makers of
TORRINGTON *NEEDLE* **BEARINGS**

window door. All openings are fitted with splash-proof guards allowing leakage-free installation. A blower clears away the abrasive splash from the window so that vision is not obscured. Work is held in one hand, gun manipulated in the other. Requirements for immediate operation are a ⅜-inch air connection and a ½-inch water connection.

Check No. 10 on Reply Card for more Details

Tumble Finisher Improved

Tumble finishing machines made by Crown Rheostat & Supply Co., 3465 N. Kimball Ave., Chicago 18, Ill., feature the company's "buffer strip lining" making possible on-the-spot replacement and keeping downtime for the relining to a minimum. A variable speed drive gives operator



a wide choice of speeds for processing of steel, die cast or other metal parts. An automatic timer control assures a definite operating time thus avoiding the over or under-running of work during the processing period.

Added features include lightweight doors with full grip door lock handles and a full gasket door plate to provide a water tight door seal and make replacement of door gasket a quick job.

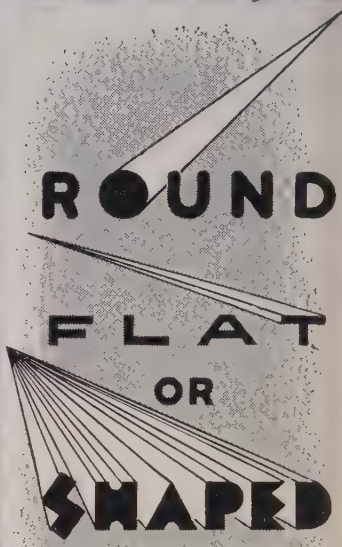
Check No. 11 on Reply Card for more Details

Accessory Table Available

An accessory table which can be mounted to any standard machine made by DoAll Co., Des Plaines, Ill., will adapt equipment to accurate, straight line bandsawing of exceptionally bulky or heavy workpieces such as die blocks, castings or forgings. It can be used for production sawing, cutoff work and for slicing intricate ferrous or nonferrous castings for inspection, as the workpiece is cut automatically with a precision finish often suitable for making porosity tests.

Table illustrated is used on a 60-

PAGE WIRE



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HIGH CARBON
STAINLESS
SPECIAL ALLOY
ARMCO IRON

You draw the Shape —Page can draw the Wire

—the way you want it for your production—whether it's ALL of your product, or only a part.
Cross-sectional areas up to .250" square; widths to ⅜"; width-to-thickness ratio not exceeding 6 to 1.

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PAGE STEEL AND WIRE DIVISION
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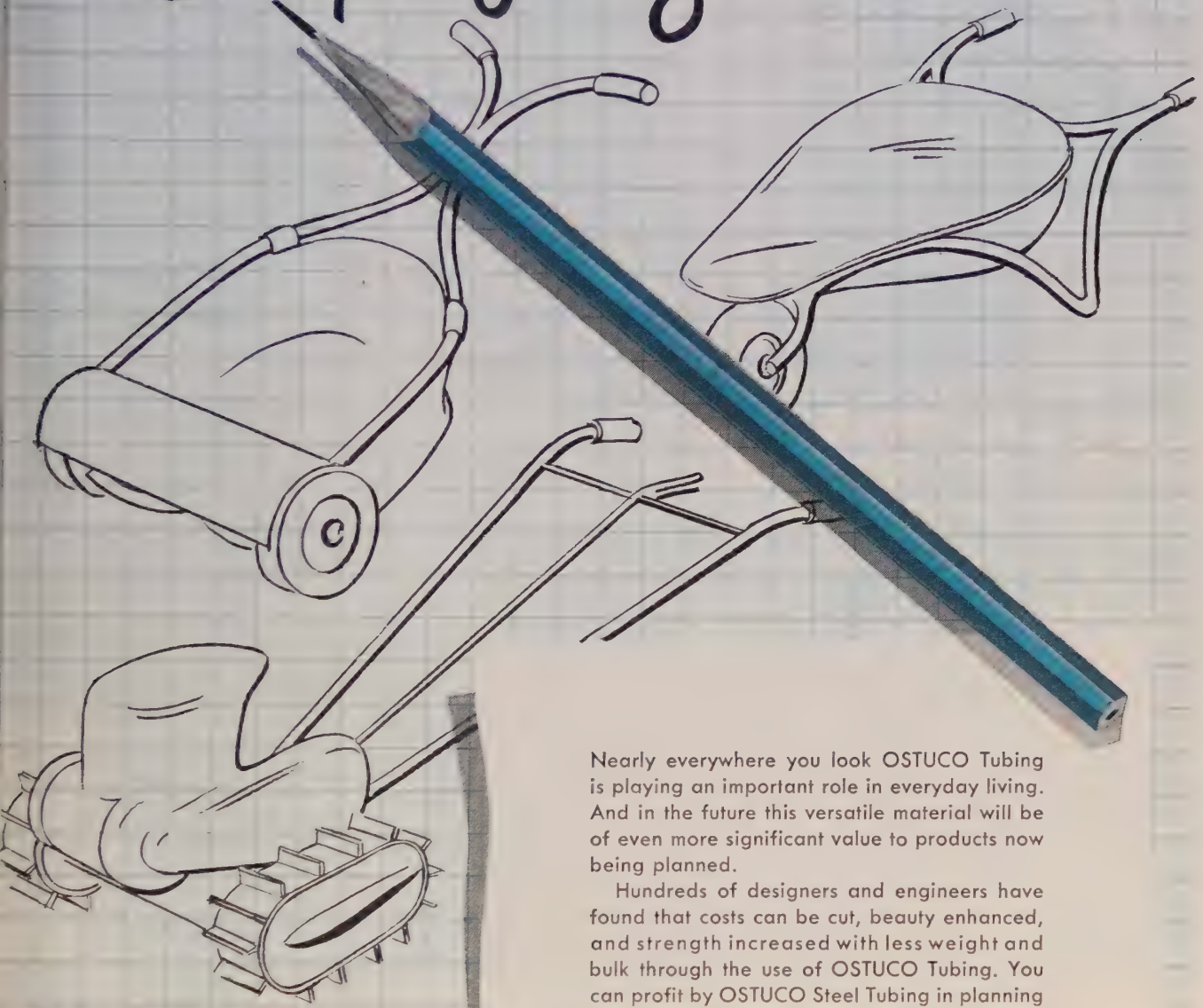
Shape of things to come...



From Your Blueprint . . . to Your Product

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Upsetting • Expanding • Reducing • Beading
End closing • Spinning • Drilling • Slotting
Notching • Flattening • Shaping • Trimming
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Nearly everywhere you look OSTUCO Tubing is playing an important role in everyday living. And in the future this versatile material will be of even more significant value to products now being planned.

Hundreds of designers and engineers have found that costs can be cut, beauty enhanced, and strength increased with less weight and bulk through the use of OSTUCO Tubing. You can profit by OSTUCO Steel Tubing in planning improvements and shaping your company's future products.

Because of military demands, we cannot always promise early delivery estimates on new civilian orders. Meanwhile, however, call upon our experienced tubing engineers and take advantage of OSTUCO Steel Tubing in your plans for the future.

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MILLION-MILE IDEA FROM WATCHING THE BIKES GO BY

From the way bicycle tires resisted the abrasion of cobblestone roads came an invention which is now an essential lifeline of the American industrial economy.

It was in 1891 that Thomas Robins first covered a conveyor belt with rubber and proved it tougher than steel when handling heavy bulk materials.

The rubber-covered belt is but one of scores of "firsts" to come from Hewitt-Robins . . . in belting, in hose, in machinery—in *better ways* to handle and process solid or fluid bulk materials.

Today you get still another "first" when you turn to Hewitt-Robins for belt conveyors. You get the *complete* job. Hewitt-Robins is the first and only organization in the world that supplies engineering, specialized machinery *and belting* from within its own corporate structure. Hewitt-Robins alone is able to take undivided responsibility from drawing board to production run.

Our three industrial Divisions work individually or as a team, depending upon the problem and your need. Next time materials handling is *your* problem, we invite you to make it *ours*.

HEWITT HR ROBINS

Executive Offices: 370 Lexington Avenue, New York 17, N. Y.

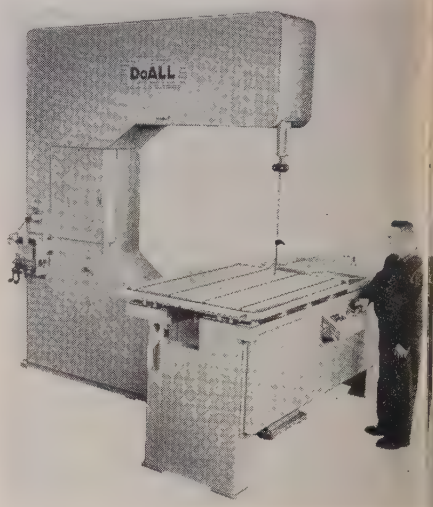
HEWITT RUBBER DIVISION: Belting, hose and other industrial rubber products

ROBINS CONVEYORS DIVISION: Conveying, screening, sizing, processing and dewatering machinery

ROBINS ENGINEERS DIVISION: Designing and engineering of materials handling systems

Hewitt-Robins is participating in the management and financing of Kentucky Synthetic Rubber Corporation

inch throat, 40-inch work height capacity band machine. It has a 40 x 48-inch table and a carriage bed 36 x 87 inches which will support a load of 3000 pounds. Table has four T slots to receive work clamps, vises, etc. Hydraulic system consists of a 5 gallon reservoir with filler opening and clean-out plate and a 2 gal-

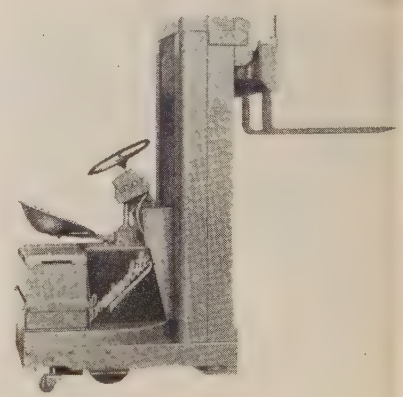


lon per minute gear type hydraulic pump driven by a ¾-hp motor. Circuit has an adjustable relief valve to limit working pressure to 200 psi. Controls, governing rate of table feed up to 18 fpm and a reversing rate of 36 fpm, are located on a panel mounted on the carriage bed.

Check No. 12 on Reply Card for more Details

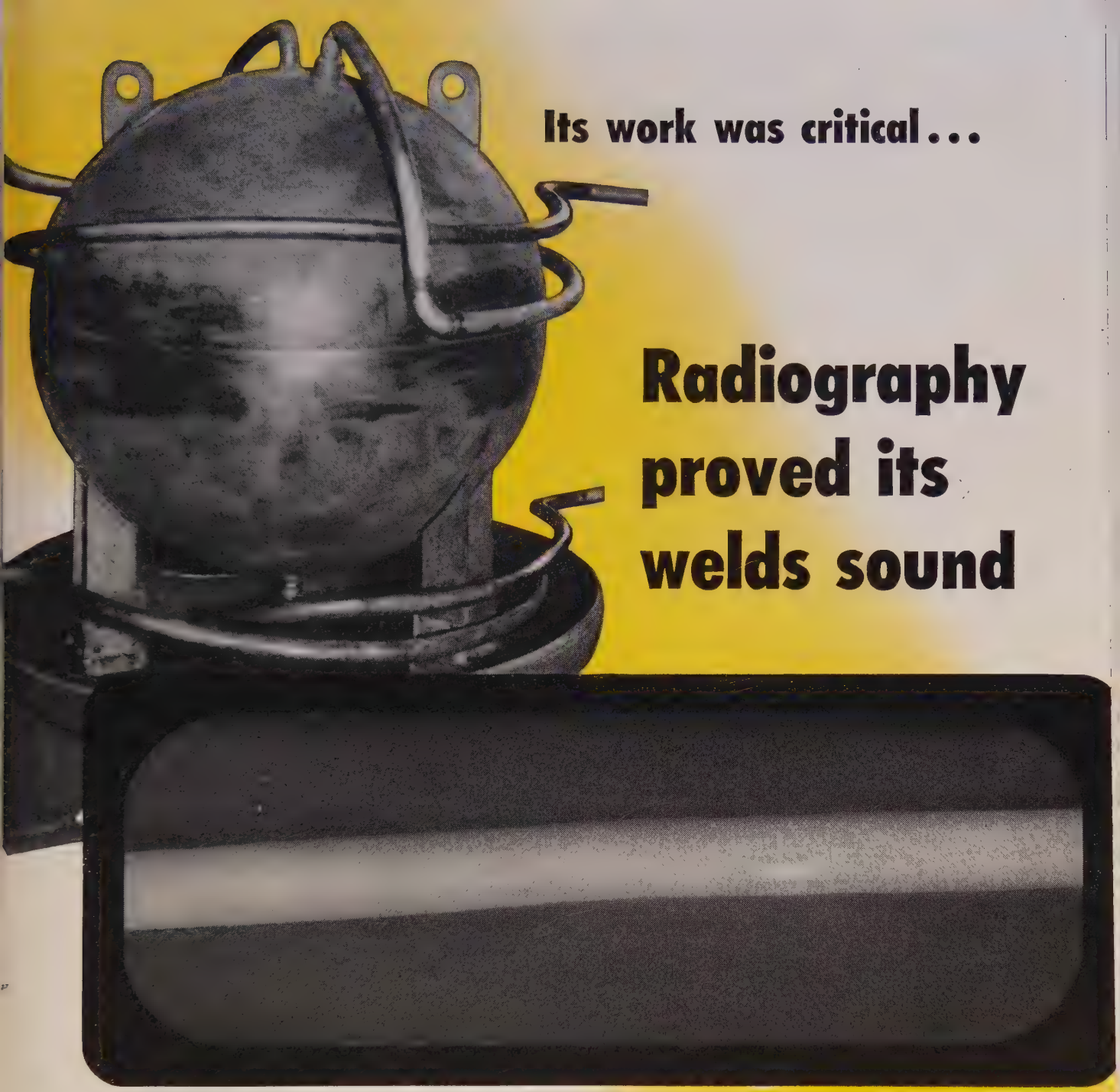
Small Plant Lift Truck

Materials Handling Division, Market Forge Co., Everett, Mass., has added a fork truck to its line of materials handling units. Developed to meet the needs of small and medium



sized plants the truck is light in weight, small in overall dimension and provides maximum visibility for the operator.

All weighty parts are placed in position to obtain maximum counter



Its work was critical...

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THIS welded sphere was made to do a vital job in an important project. The welded girth seam had to be sound. What's more, the engineers had to know it was sound.

That called for radiography. For radiography would reveal any serious lack of fusion or gas porosities. It would prove the soundness of the weld.

This is one reason radiography has opened new fields to welders. It is the reason welding has become accepted even in making pressure vessels.

If you would like to discuss the ways radiography can help increase your business and build a reputation for high-quality work, get in touch with your x-ray dealer.

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Radiography...

another important function of photography

Kodak
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balance with loads. The 500-pound storage battery, for instance, is located as far from the fulcrum wheels as possible. Overall length of the truck is 55 inches exclusive of forks and width is 31 inches. Good operator visibility is obtained by providing more than 8 inches of clear opening on each side of the narrow hydraulic lifting mechanism which is located midway on the mast. The 12 v storage battery has a 340 ampere-hour capacity and delivers a full load speed of 3 mph over level smooth floors and a no load speed of 3.5 mph.

Check No. 13 on Reply Card for more Details

Portable Electric Drill Gun

Desoutter portable electric drill gun DG45, available from Newage International Inc., New York 17, N. Y., is geared down to a low 450 rpm, has a capacity of $\frac{5}{16}$-inch in steel and $\frac{5}{8}$-inch in wood and weighs 3 pounds. High strength lightweight silicon alloy pressure die castings are used throughout. Helical gears are made from heat treated nickel-chrome molybdenum steel.

Check No. 14 on Reply Card for more Details

Low Voltage Circuit Breaker

A low voltage air circuit breaker, the DB-50, is offered by Westinghouse Electric Corp., Pittsburgh 30, Pa. It features a completely new air delayed series overcurrent tripping device, with all elements adjustable, that provides long time delay on overloads and instantaneous tripping of fault currents. Unit is rated at 600 v, ac; 250 v, dc and has a continuous rating of 100 to 1600 amperes.

Check No. 15 on Reply Card for more Details

Three-Blade Hole Cutters

Cutting of accurate, finished holes in a single operation is possible with the three-blade adjustable hole cutter introduced by Robert H. Clark Co., Beverly Hills, Calif. Line of cutters has a cutting range of 5/8 to 5-inch diameters and thickness capacities from thin sheets to 1 inch. Blades are replaceable and are easy to sharpen and set.

Check No. 16 on Reply Card for more Details

One-Piece Fastener

Extruded nylon is used as the locking medium in the new Nylok type E locknut produced by Townsend Co., New Brighton, Pa. The one-piece, prevailing torque type nut is designed to permit installation from either end and provides positive locking action in any position. When it is removed, nylon makes the locking element return to its original shape giving much reusability. It also makes it possible to lock the nut in any position on a bolt, no seating is necessary.

Check No. 17 on Reply Card for more Details

Hydraulic Lubricant Pump

Hydra-Lube pump, made by Trabon Engineering Corp., Cleveland 3, O., is operated from the hydraulic system and is adaptable to machine tools, presses, drill presses, etc. The oil or grease pump is connected to the supply lines of any double acting cylinder. Each stroke of the cylinder cycles the pump once.

Check No. 18 on Reply Card for more Details

High Voltage Capacitors

Sprague Electric Co., North Adams, Mass., has developed 1000 and 2500 v dc Hypass three-terminal network feed-through capacitors. They are particularly suited for suppression of radio interference and harmonic generation in high voltage circuits in transmitters and industrial electronic equipment.

Check No. 19 on Reply Card for more Details

Thin Electrical Steel

Known as Tran-Cor T-O-S, a new thin electrical steel is offered by Armco Steel Corp., Middletown, O. It can be operated at very high inductions and is intended for use in wound-type transformers and reactors which operate at 400 cycles.

Check No. 20 on Reply Card for more Details

Sampling or Vending Valve

A new double duty valve that can be used for sampling oils and other liquids or for venting air into tanks is announced by Oil-Rite Corp., Milwaukee 15, Wis. When used for sampling, valve is inserted close to the bottom of the tank containing the liquid permitting samples to be drawn off conveniently. Inserted at top of a tank, it can be used for venting air.

Check No. 21 on Reply Card for more Details

Black Oxide Process

Mitchell - Bradford Chemical Co., Stratford, Conn., announces a new black oxide process for iron and steel known as Black Magic type A. It is a one bath-one salt process and operates at a temperature of 290° F. It is self-rectifying and will rectify build-up of colloidal red iron oxides in the bath and other contaminants which may inadvertently be introduced into the solution. The finish cuts down blackening time cycle and will also blacken heat treated or hardened work easily.

Check No. 22 on Reply Card for more Details

Piercing Punches, Button Dies

Producto Machine Co., Bridgeport, Conn., introduces a standard line of Ring piercing punches and button dies for tool and diemakers. Ring design feature takes place of punch head.

Check No. 23 on Reply Card for more Details

New Type Vibrator

Operating with an effective all-directional vibration, the Peterson Vibrolator available from Martin Engineering Co., Kewanee, Ill., moves arching materials toward the outlet without damaging hopper faces. It starts instantly without manual assistance and operates quietly. The vibrator can be mounted many different ways to allow for variance in operating conditions, materials and equipment.

Check No. 24 on Reply Card for more Details

Ultraviolet Lamps

A new line of Blak-Ray high-intensity long wave ultraviolet lamps for observing fluorescence is announced by Ultra-Violet Products Inc., South Pasadena, Calif. When the invisible black-light rays are directed at certain substances they cause a phenomenon known as fluorescence whereby they radiate a color different from their own, which makes lamps useful for inspection, sorting and analysis. They are available in 4, 8, 15, 30, 40, and 80 watt sizes.

Check No. 25 on Reply Card for more Details

Expansion Type Bellows

For the absorption of high frequency vibration and lineal expansion in many types of equipment, Titeflex Inc., Newark, N. J., introduces an expansion type bellows. Constructed of convoluted metal diaphragms welded into complete units, bellows are available in sizes from 1 to 5 inches ID in various lengths, made from plain and stainless steels, brass, bronze, Monel and Inconel.

Check No. 26 on Reply Card for more Details

FOR MORE INFORMATION

on the new products and equipment in this section, fill in a card. It will receive prompt attention.

The Market Outlook

STEEL MARKET outlook for third quarter is shaping up pretty much as expected. From the standpoint of supply, in all likelihood it will prove about the toughest yet experienced in the emergency by civilian goods manufacturers. With defense and defense-support programs scheduled to take a larger bite of available supply, there will be less tonnage for unrated consumption. "Free" steel for the general market after rated needs are cared for may not exceed 25 to 30 per cent of total production, it is estimated in some quarters. In certain products, the amount of "free" steel will fall considerably short of demand despite reduced manufacturing schedules occasioned by mandatory cutbacks in steel use and vacation interruptions.

TRANSITION—High degree of uncertainty prevails among steel producers and their customers as date for switching to Controlled Materials Plan distribution, July 1, approaches. Although considerable preliminary work has been done in shaping administrative details, including a huge amount of paper work by steelmakers and consumers, much more remains before a smoothly functioning supply system will be evolved. Procedures for reporting monthly production and shipments of steel mill products under CMP were outlined last week in instructions to producers by the National Production Authority. Steelmakers are asked to file their first reports in a new reporting sheet by June 18, and thereafter no later than the fifteenth of each month.

CMP BUILD-UP—Indications are third quarter will be only a "warm-up" period for CMP, complete transition from the priorities system being unlikely before fourth quarter at earliest. Meanwhile, preparatory to diverting larger tonnage to defense and related needs, steel control authorities are issuing additional regulatory orders on production and distribution which add up to tighter controls and less tonnage for the general consuming trade. As part of the transition to CMP, third quarter use of iron and steel in most consumer durable goods is restricted to 70 per cent of base period consumption. Automobiles, removed from the list of consumer durables, are controlled under a separate regulation which, through steel use limitation, will have the effect of cutting third quarter output an estimated 37 per cent under third quarter 1950. This will mean production of 1,200,000 cars against 1,894,676 a year ago.

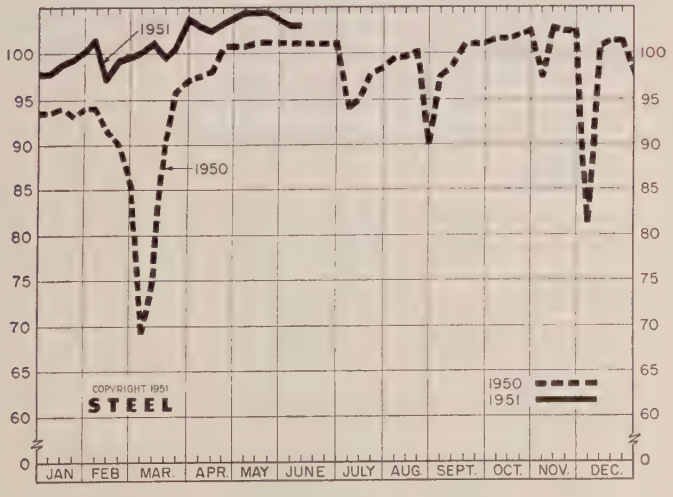
CONSUMPTION—With more tonnage being taken from nonrated civilian goods the question naturally rises: Where is the conserved steel going? Direct defense, of course, will get larger tonnage, but the bulk of the savings from civilian goods curtailments will go to indirect defense activities, along with increased distribution to the warehouses and steel converters. Changes in product mix made possible by curtailments in consumer goods will permit greater production emphasis on plates, structurals and bars.

PRICES—The steel market is firmly established at price levels prevailing last January when the government freeze went into effect. An exception to the general rule was the action last week by Inland Steel Co. in reducing its price on rail steel merchant and reinforcing bars. Some changes in nickel alloy steels and stainless steel are expected also as result of the recent increase of 6 cents per pound in the price of nickel.

COMPOSITES—STEEL's weighted index of finished steel prices holds steady at 171.92 as does the arithmetical composite at $106.32. Pig iron is unchanged with No. 2 foundry, $52.54, basic, $52.16, and malleable, $53.27. Steelmaking scrap composite is steady at $44 and compares with $40.83 a year ago.

PRODUCTION—Steelmaking operations held at 103 per cent of capacity last week, the eighth consecutive week the mills have operated at that or a higher level. Production during the period was the largest on record.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended June 9	Change	Same Week 1950	Same Week 1949
Pittsburgh	103	+ 1	101.5	82
Chicago	106	— 2*	103	98.5
Mid-Atlantic	101	— 0.5	98	85.5
Youngstown	105	0	106	93
Wheeling	98.5	0	106.5	80.5
Cleveland	101	— 0.5*	99.5	96.5
Buffalo	104	0	104	101.5
Birmingham	100	0	100	100
New England	89	0	86	58
Cincinnati	102	— 2	106	94
St. Louis	99.5	+ 1	91	73.5
Detroit	103	— 4.5*	104	90
Western	105.5	+ 5	101	85.5
Estimated national rate	103	0	101	87.5

Based on weekly steelmaking capacity of 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

* Change from revised rate for preceding week.

The Metalworking Outlook—p. 39 Production-Engineering News—p. 75

Composite Market Averages

	June 7 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)..	171.92	171.92	171.92	156.25	111.86
Index in cents per lb.	4.657	4.657	4.657	4.233	3.030
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$106.32	$106.32	$106.32	$94.32	$63.54
No. 2 Fdry, Pig Iron, GT..	52.54	52.54	52.54	46.47	26.17
Basic Pig Iron, GT	52.16	52.16	52.16	45.97	25.50
Malleable Pig Iron, GT ...	53.27	53.27	53.27	47.27	26.79
Steelmaking Scrap, GT ...	44.00	44.00	44.00	31.67	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	June 7 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R., del. Philadelphia	4.20	4.20	4.20	3.93	2.82
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.10–15	3.10
Shapes, Std., Pittsburgh ..	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia ..	3.91	3.91	3.91	3.46	2.465
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa. ...	4.15	4.15	4.15	3.60	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.60	2.50
Sheets, H.R., Pittsburgh...	3.60–75	3.60–75	3.60–75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, CR., Pittsburgh ..	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv, Pittsburgh..	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh....	3.75–4.00	3.75–4.00	3.75–4.00	3.25	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh ...	4.65–5.35	4.65–5.35	4.65–5.35	4.15	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.35–5.60	4.35–5.60	4.35–5.60	4.35–40	3.15
Wire, Basic, Pittsburgh....	4.85–5.10	4.85–5.10	4.85–5.10	4.50	3.05
Nails, Wire, Pittsburgh ...	5.90–6.20	5.90–6.20	5.90–6.20	5.30	3.25
Tin plate, box, Pittsburgh.	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, 7/32-⅜", Pitts. ..	4.10–30	4.10–30	4.10–30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47.00	$27.00
Basic Valley	52.00	52.00	52.00	46.00	26.00
Basic, del. Phila.	56.49	56.49	56.49	49.44	27.84
No. 2 Fdry, Pitts.	52.50	52.50	52.50	46.50	26.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	46.50	26.50
No. 2 Fdry, Valley	52.50	52.50	52.50	46.50	26.50
No. 2 Fdry, Del. Phila. ...	56.99	56.99	56.99	49.94	28.34
No. 2 Fdry, Birm.	48.88	48.88	48.88	42.38	22.88
No. 2 Fdry (Birm.)del. Cin.	55.33	55.33	55.33	49.08	26.94
Malleable Valley	52.50	52.50	52.50	46.50	26.50
Malleable, Chicago	52.50	52.50	52.50	46.50	26.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	60.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt. Pitts..	$45.00	$45.00	$45.00	$46.00	$20.00
No. 1 Heavy Melt. E. Pa..	43.50	43.50	43.50	32.50	18.75
No. 1 Heavy Melt. Chicago	43.50	43.50	43.50	40.00	18.75
No. 1 Heavy Melt. Valley..	45.00	45.00	45.00	44.75	20.00
No 1 Heavy Melt. Cleve. .	44.00	44.00	44.00	42.75	19.50
No. 1 Heavy Melt. Buffalo.	44.00	44.00	44.00	42.00	19.25
Rails, Rerolling, Chicago .	52.50	52.50	52.50	52.50	22.25
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	48.50	20.00

* F. o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl. .	$14.75	$14.75	$14.75	$14.25	$7.50
Beehive, Fdry., Connlsvl. .	17.50	17.50	17.50	15.50	8.25
Oven Fdry., Chicago	21.00	21.00	21.00	21.00	13.00

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	22.50	14.375
Zinc, E. St. Louis.....	17.50	17.50	17.50	14.50	8.25
Lead, St. Louis	16.80	16.80	16.80	11.80	8.10
Tin, New York	139.00	139.00	142.00	76.625	52.00
Aluminum, del.	19.00	19.00	19.00	17.50	15.00
Antimony, Laredo, Tex. ..	42.00	42.00	42.00	24.50	14.50
Nickel, refinery, duty paid.	56.50	50.50	50.50	48.00	35.00

Pig Iron

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn,N.Y.,del.	....	58.69	59.46	....
Newark,del.	56.74	57.24	57.74	58.24
Philadelphia,del.	56.49	56.99	57.49	57.99
Birmingham District				
AlabamaCity,Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward,Ala. W15	48.38	48.88	....	....
Cincinnati,del.	....	55.33	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda,N.Y. W12	52.00	52.50	53.00	....
No.Tonawanda,N.Y. T9	....	52.50	53.00	....
Boston,del.	61.63	62.13	62.63	....
Rochester,N.Y., del.	54.74	55.24	55.74	....
Syracuse,N.Y.,del.	55.72	56.22	56.72	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary,Ind. U5	52.00	....	52.50	....
IndianaHarbor,Ind. I-2	52.00	....	52.50	....
So.Chicago,Ill. W14	52.00	52.50	52.50	....
So.Chicago,Ill. Y1	52.00	52.50	52.50	....
So.Chicago,Ill. U5	52.00	....	52.50	53.00
Milwaukee,del.	53.97	54.47	54.47	54.97
Muskegon,Mich.,del.	....	58.20	58.20	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, del. from Cleve.	54.49	54.99	54.99	55.49
Lorain,O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie,Pa. I-3	52.00	52.50	52.50	53.00
Everett,Mass. E1	....	51.75	52.25	....
Fontana,Calif. K1	58.00	58.50	....	....
Geneva,Utah G1	52.00	52.50	....	....
Seattle,Tacoma,Wash.,del.	....	60.35	....	....
Portland,Oreg.,del.	....	60.35	....	....
LosAngeles,SanFrancisco,del.	59.85	60.35	....	....
GraniteCity,Ill. G4	53.90	54.40	54.90	....
St.Louis,del. (inc. tax)	54.66	55.16	55.66	....
Ironton,Utah C11	52.00	52.50	....	....
LoneStar, Tex. L6	48.00	*48.50	48.50	....
Minnequa,Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	....	52.50	52.50	53.00
Pitts.,N.&S. sides, Ambridge, Aliquippa,del.	....	53.74	53.74	54.24
McKeesRocks, del.	....	53.49	53.49	53.99
Lawrenceville, Homestead, McKeesport,Monaca,del.	....	54.00	54.00	54.50
Verona,del.	....	54.48	54.48	54.98
Brackenridge,del.	....	54.72	54.72	55.22
Bessemer,Pa. U5	52.00	....	52.50	53.00
Clairton,Rankin,So.Duquesne,Pa. U5	52.00	....	....	....
McKeesport,Pa. N3	52.00	....	....	53.00
Monnessen,Pa. P7	54.00	....	....	....
Sharpsville,Pa. S6	....	....	52.50	53.00
Steelton,Pa. B2	54.00	54.50	55.00	55.50
Swedeland,Pa. A3	56.00	56.50	57.00	57.50
Toledo,O. I-3	52.00	52.50	52.50	53.00
Cincinnati,del.	57.21	57.71	....	....
Troy,N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard,O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield,O.,del.	56.43	56.93	56.93	57.43

*Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson,O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

NiagaraFalls,N.Y. P15	$83.00
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 x 6)

Lyles,Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton,Pa. B2	60.00
Philadelphia delivered	63.11
Troy,N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, June 7, 1951; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 .....52.00

INGOTS, Alloy (NT)
Detroit R7 .....$54.00
Fontana,Calif. K1 .....80.00
Houston,Tex. S5 .....62.00
Midland,Pa. C18 .....54.00
Munhall,Pa. U5 .....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 .....$56.00
Clairton,Pa. U5 .....56.00
Ensley,Ala. T2 .....56.00
Fairfield,Ala. T2 .....56.00
Fontana,Calif. K1 .....75.00
Gary,Ind. U5 .....56.00
Johnstown,Pa. B2 .....56.00
Lackawanna,N.Y. B2 ..56.00
Munhall,Pa. U5 .....56.00
So.Chicago,Ill. U5 .....56.00
So.Duquesne,Pa. U5 ..56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 .....$66.00
Buffalo R2 .....66.00
Canton,O. R2 .....66.00
Clairton,Pa. U5 .....66.00
Cleveland R2 .....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 .....69.00
Ensley,Ala. T2 .....66.00
Fairfield,Ala. T2 .....66.00
Fontana,Calif. K1 .....85.00
Gary,Ind. U5 .....66.00
Geneva,Utah G1 .....66.00
Houston,Tex. S5 .....74.00
Johnstown,Pa. B2 .....66.00
Lackawanna,N.Y. B2 ..66.00
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....66.00
Seattle B3 .....85.00
So.Chicago R2,U5,W14 ..66.00
So.Duquesne,Pa. U5 ..66.00
So.SanFrancisco B3 ...85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$70.00
Buffalo R2 .....70.00
Canton,O. R2 .....70.00
Canton,O. (29) T7 ...66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 .....73.00
Fontana,Calif. K1 ...89.00
Gary,Ind. U5 .....70.00
Houston,Tex. S5 .....78.00
Ind.Harbor,Ind. Y1 ...70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ..70.00
LosAngeles B3 .....90.00
Massillon,O. R2 .....70.00
Midland,Pa. C18 .....70.00
Munhall,Pa. U5 .....70.00
So.Chicago R2,U5,W14 .70.00
So.Duquesne,Pa. U5 ...70.00
Struthers,O. Y1 .....70.00
Warren,O. C17 .....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$82.00
Cleveland R2 .....82.00
Fontana,Calif. K1 ...103.00
Gary,Ind. U5 .....82.00
Massillon,O. R2 .....82.00
So.Chicago,Ill. R2 ....82.00
So.Duquesne,Pa. U5 ..82.00

SHEET BARS (NT)
Fontana,Calif. K1 ...$89.00

SKELP
Aliquippa,Pa. J5 .....3.45
Munhall,Pa. U5 .....3.35
Warren,O. R2 .....3.35
Youngstown R2, U5 ... 3.35

WIRE RODS
AlabamaCity,Ala. R2 ..4.10
Buffalo W12 .....4.10
Cleveland A7 .....4.10
Donora,Pa. A7 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.90
Houston,Tex. S5 .....4.50
Johnstown,Pa. B2 .....4.10
Joliet,Ill. A7 .....4.10
LosAngeles B3 .....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 .....4.30
No.Tonawanda,N.Y.B11 4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 .....4.20
So.Chicago,Ill. R2 ....4.10
SparrowsPoint,Md. B2 ..4.20
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 .....4.10
Torrance,Calif. C11 ....4.90
Worcester A7 .....4.40

PLATES, Wrought Iron
Economy,Pa. B14 .....8.60

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..3.60
Aliquippa,Pa. J5 .....3.65
Bessemer,Ala. T2 .....3.65
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fairfield,Ala. T2 .....3.65
Fontana,Calif. K1 .....4.25
Gary,Ind. U5 .....3.65
Geneva,Utah G1 .....3.65
Houston,Tex. S5 .....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.25
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 .....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....4.95
Portland,Oreg. O4 .....4.50
Seattle B3 .....4.30
So.Chicago,Ill. U5, W14 .3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 .....4.35
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 .....4.35
So.Chicago,Ill. U5 .....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....5.50
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.10
Gary,Ind. U5 .....5.50
Geneva,Utah G1 .....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y1 ....6.00
Johnstown,Pa. B2 .....5.50
Lackawanna,N.Y.(14)B2 5.50
LosAngeles B3 .....6.05
Munhall,Pa. U5 .....5.50
Seattle B3 .....6.10
So.Chicago,Ill. U5 .....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 .....6.00

Wide Flange
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fontana,Calif. K1 .....4.65
Lackawanna,N.Y. B2 ...3.70
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....5.50
Lackawanna,N.Y. B2 ...5.50
Munhall,Pa. U5 .....5.45
So. Chicago,Ill. U5 ....5.45

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ....4.45
Munhall,Pa. U5 .....4.45
So.Chicago,Ill. U5 .....4.45

BEARING PILES
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.65
Bessemer,Ala. T2 .....5.65
Clairton,Pa. U5 .....5.65
Cleveland J5, R2 .....5.65
Conshohocken,Pa. A3 ..5.90
Fairfield,Ala. T2 .....5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 .....5.65
Geneva,Utah G1 .....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 ....6.15
Johnstown,Pa. B2 .....5.65
Munhall,Pa. U5 .....5.65
Pittsburgh J5 .....5.65
Seattle B3 .....6.55
Sharon,Pa. S3 .....5.70
So.Chicago,Ill. U5 .....5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 .....5.65
Youngstown Y1 .....6.15

PLATES, Open-Hearth Alloy
Claymont, Del. C22 ....4.85
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ..5.05
Fontana,Calif. K1 .....5.70
Gary, Ind. U5 .....4.75
Johnstown,Pa B2 .....4.75
Munhall Pa. U5 .....4.75
Sharon,Pa. S3 .....5.20
So.Chicago,Ill. U5 .....4.75
SparrowsPoint,Md. B2 ..4.75

FLOOR PLATES
Cleveland J5 .....4.75
Conshohocken,Pa. A3 ..4.75
Harrisburg,Pa. C5 .....5.95
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 .....4.75
So.Chicago,Ill. U5 .....4.75

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Ashland,Ky.(15) A10 ..3.70
Bessemer,Ala. T2 .....3.70
Clairton,Pa. U5 .....3.70
Claymont,Del. C22 .....4.15
Cleveland J5, R2 .....3.70
Coatesville,Pa. L7 .....4.15
Conshohocken,Pa. A3 ...4.15
Fairfield,Ala. T2 .....3.70
Fontana,Calif.(30) K1 ..4.30
Gary,Ind. U5 .....3.70
GraniteCity,Ill. G4 .....4.40
Geneva,Utah G1 .....3.70
Harrisburg,Pa. C5 .....4.95
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ...3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 .....3.70
Pittsburgh J5 .....3.70
Seattle B3 .....4.60
Sharon,Pa. S3 .....3.95
So.Chicago,Ill. U5, W14.3.70
SparrowsPoint,Md. B2..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 .....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1.3.70

PLATES, Carbon A. R.
Fontana,Calif. K1 .....5.45
Geneva,Utah G1 .....4.85

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ...3.95
Ashland,lcl(15) A10 ....4.45
Cleveland,c.l. R2 .....4.30
Warren,O.c.l. R2 .....4.30

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Alton,Ill.(1) L1 .....3.95
Atlanta,Ga. A11 .....4.25
Bessemer,Ala. T2 .....3.70
Buffalo R2 .....3.70
Canton,O. R2 .....3.70
Clairton,Pa. U5 .....3.70
Cleveland R2 .....3.70
Detroit R7 .....3.85
Emeryville,Calif. J7 ...4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 .....5.05
N.Tonawanda,N.Y. B11.3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 .....4.65
Seattle B3, N14 .....4.45
So.Chicago R2, U5, W14.3.70
So.Duquesne,Pa. U5 ...3.70
So.SanFran.,Cal. B3 ...4.45
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
Youngstown R2, U5 ...3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....3.70
Atlanta A11 .....4.25
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ..3.70
Niles,Calif. P1 .....5.05
Portland,Oreg. O4 .....4.65
SanFrancisco S7 .....4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 .....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .... 4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.30
Canton,O.(29) T7 .....3.95
Clairton,Pa. U5 .....4.30
Detroit R7 .....4.45
Ecorse,Mich. G5 .....4.65
Fontana,Calif. K1 .....5.35
Gary,Ind. U5 .....4.30
Houston,Tex. S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.30
Midland,Pa. C18 .....4.30
So.Chicago R2,U5,W14 ..4.30
So.Duquesne,Pa. U5 ...4.30
Struthers,O. Y1 .....4.30
Warren,O. C17 .....4.30
Youngstown U5 .....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....4.55
Gary,Ind. U5 .....4.55
Youngstown U5 .....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.55
Bessemer,Ala. T2 .....5.55
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.55
Cleveland R2 .....5.55
Fairfield,Ala. T2 .....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1..6.05
Johnstown,Pa. B2 .....5.55
Lackawanna,N.Y. B2 ...5.55
LosAngeles B3 .....6.25
Pittsburgh J5 .....5.55
Seattle B3 .....6.30
So.Duquesne,Pa. U5 ...5.55
So.SanFrancisco B3 ...6.30
Struthers,O. Y1 .....6.05
Youngstown U5 .....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa.M12,R2 .4.55
Buffalo B5 .....4.60
Camden,N.J. P13 .....5.00
Carnegie,Pa. C12 .....4.55
Chicago W18 .....4.55
Cleveland A7, C20 .....4.55
Detroit P17 .....4.70
Donora,Pa. A7 .....4.55
Elyria,O. W8 .....4.55
FranklinPark,Ill. N5 ...4.55
Gary,Ind. R2 .....4.55
GreenBay,Wis. F7 .....4.55
Hammond,Ind. L2, M13.4.55
Hartford,Conn. R2 .....5.10
Harvey,Ill. B5 .....4.55
LosAngeles R2 .....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca,Pa. S17 .....4.55
Newark,N.J. W18 .....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 .....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 .....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa.(5) K3 ...5.00
Struthers,O. Y1 .....4.55
Waukegan,Ill. A7 .....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....5.40
BeaverFalls,Pa. M12 ...5.40
Bethlehem,Pa. B2 .....5.40
Buffalo B5 .....5.40
Camden,N.J. P13 .....5.80
Canton,O. R2 .....5.40
Canton,O.(29) T7 .....4.90
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7 .....5.45
Cleveland C20 .....5.40
Detroit P17 .....5.55
Donora,Pa. A7 .....5.45
Elyria,O. W8 .....5.40
Gary,Ind. R2 .....5.40
Hammond,Ind. L2, M13.5.40
Hartford,Conn. R2 .....5.85
Harvey,Ill. B5 .....5.40
Lackawanna,N.Y. B2 ..5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14.5.40
Struthers,O. Y1 .....5.40
Warren,O. C17 .....5.40
Waukegan,Ill. A7 .....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ...4.75
ChicagoHts. (3,4) *I-2* 4.50
Franklin,Pa.(3, 4) F5...4.75
FortWorth,Tex.(26) T4..4.85
Huntngtn,W.Va.(3) W7.5.50
Marion,O.(3) P11 .....4.75
Moline,Ill.(3) R2 .....3.80
Tonawanda (3,4) B12 ..4.75
Williamsport(3) S19 ...5.00
Williamsport(4) S19 ...5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover,(Eng.Bolt) U1 ..13.50
Dover(Wrgt.Iron) U1 .12.25
Economy,Pa. (S.R.) B14.9.60
Economy,Pa.(D.R.)B14 11.90
Economy,(Staybolt)B14 12.20
McK.Rks.(Staybolt) L5.14.50
McK.Rks.(S.R.) L5 ....9.60
McKRks.(D.R.) L5 ...13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.70
Alton,Ill.(6) L1 .....3.70
Atlanta A11 .....4.25
Buffalo R2 .....3.70
Cleveland R2 .....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 .....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....4.40
Portland,Oreg. O4 .....4.65
Seattle B3 .....4.60
Sharon,Pa. S3 .....4.45
So.Chicago,Ill. R2 .....3.70
So.Duquesne,Pa. U5 ...3.70
So.SanFrancisco B3 ....4.45
SparrowsPoint,Md. B2 ..3.70
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Youngstown R2, U5 ....3.70

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 ..5.50
Johnstown, ¼-1" B2 ...4.75
LosAngeles B3 .....5.45
Marion,O. P11 .....5.00
Seattle B3 N14 .....5.55
So.SanFrancisco B3 ....5.45
SparrowsPt. ¼-1" B2 ...4.75
Williamsport,Pa. S19 ..5.10

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala R2 ...3.60
Ashland,Ky.(8) A10 ...3.60
Butler,Pa. A10 .....3.60
Cleveland J5, R2 .....3.60
Conshohocken,Pa. A3 ..4.00
Detroit M1 .....4.40
Ecorse,Mich.(8) G5 ....3.80
Fairfield,Ala. T2 .....3.60
Fontana,Calif. K1 .....4.55
Gary,Ind. U5 .....3.60
Geneva,Utah G1 .....3.70
GraniteCity,Ill. G4 .....4.30
Ind.Harbor,Ind. I-2,Y1..3.60
Irvin,Pa. U5 .....3.60
Lackawanna,N.Y. B2 ..3.60
Munhall,Pa. U5 .....3.60
Niles,O. N12 .....5.25
Pittsburg,Calif. C11 ....4.30
Pittsburgh J5 .....3.60
Sharon,Pa. S3 .....4.00
So.Chicago,Ill. W14 ....3.60
SparrowsPoint,Md. B2 ...3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 .....3.60
Weirton,W.Va. W6 .....3.60
WestLeechburg,Pa. A4..3.75
Youngstown U5, Y1 ...3.60

SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 ..4.75
Dover, O. R1 .....5.65
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. E6 .....5.65
Niles,O. N12 .....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R. (14-ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 .....5.40
Conshohocken,Pa. A3 ..5.65
Ecorse,Mich. G5 .....5.95
Fairfield,Ala. T2 .....5.40
Fontana,Calif. K1 .....6.35
Gary,Ind. U5 .....5.40
Ind.Harbor,Ind. I-2 ....5.40
IndianaHarbor,Ind. Y1..5.90
Irvin,Pa. U5 .....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 .....5.40
Sharon,Pa. S3 .....5.40
So.Chicago,Ill. U5 .....5.40
SparrowsPoint(36) B2 ..5.40
Warren,O. R2 .....5.40
Weirton,W.Va. W6 .....5.75
Youngstown U5 .....5.40
Youngstown Y1 .....5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....6.55
Ecorse,Mich. G5 .....7.10
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.55
IndianaHarbor,Ind. Y1 .7.05
IndianaHarbor,Ind. I-2..6.55
Irvin,Pa. U5 .....6.55
Lackawanna(37) B2 ...6.55
Pittsburgh J5 .....6.55
SparrowsPoint(38) B2 ..6.55
Warren,O. R2 .....6.55
Weirton,W.Va. W6 ....6.90
Youngstown Y1 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana, Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 Ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

ROOFING SHORT TERNES (8 lb. coated)

Gary,Ind. U5	9.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary, U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo G16	6.25	...
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$8.45	$8.70
Fairfield,Ala T2.	8.55	8.80
Gary U5	8.45	8.70
Ind.Har. I-2, Y1.	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11	9.20	9.45
Sp.Pt.Md. B2	8.55	8.80
Warren R2	8.45	8.70
Weirton W6	8.45	8.70
Yorkville,O. W10.	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville, O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.80
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

STRIP, Hot-Rolled Alloy

Bridgprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S8	5.85
Youngstown U5	5.50

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill.(1) L1	3.75
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt.Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain (10) S15	4.00
NoTonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn,Conn.(10) S15	10.75
Pawtucket,R.I.(11) N8	10.75
Pawtucket,R.I.(12) N8	11.05
Sharon,Pa. S3	10.60
Worcester,Mass. A7	10.80
Youngstown C8	10.60

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D8	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.85
Fontana,Calif. K1	6.80
FranklinPark,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.85
NewCastle(40) E5	5.35
NewHaven,Conn. D2	5.35
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.85
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.35
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown O8	5.25

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.85	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	....
Carnegie,Pa. S18	...	6.80	7.40	9.65	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	....
Detroit D2	5.60	6.65	7.25	...	....
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	....
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	....
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. N8: Cleve.-or-Pitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.85	11.65
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork, W8	...	...	10.30	12.50	15.35

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	7.25	8.50	9.80
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	....	....	....
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	....	....	....
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (8) A10 ...3.75
Warren,O. R2 .....4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....5.25

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.05
Riverdale,Ill. A1 .....3.90
Sharon,Pa. S3 .....4.15
Youngstown U5 .....3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19) K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora A7	5.70	6.15
Duluth A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
Sparrows Pt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

WIRE, (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsvle M8	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass. W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

ROPE WIRE	(A)	(B)
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria, O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass. W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers, O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...4.85
Aliquippa,Pa. J5 .....4.85
Atlanta A11 .....5.10
Alton,Ill.(1) L1 .....4.85
Bartonville,Ill.(1) K4 ..4.85
Buffalo W12 .....4.85
Chicago W13 .....5.10
Cleveland A7, C20 .....4.85
Crawfordsville,Ind. M8..5.10
Donora,Pa. A7 .....4.85
Duluth,Pa. A7 .....4.85
Fairfield,Ala. T2 .....4.85
Fostoria,O.(24) S1 .....5.35
Houston S5 .....5.25
Johnstown,Pa. B2 .....4.85
Joliet, Ill. A7 .....4.85
KansasCity,Mo. S5 ....5.45
Kokomo,Ind. C16 .....4.95
LosAngeles B3 .....5.80
Minnequa,Colo. C10 ....5.10
Monessen,Pa. P7 .....5.10
Newark, 6-8ga. I-1.....5.50
No. Tonawanda B11 ...4.85
Palmer,Mass. W12 .....5.15
Pittsburg,Calif. C11 ....5.80
Portsmouth,O. P12 .....5.25
Rankin,Pa. A7 .....4.85
So.Chicago,Ill. R2 .....4.85
So.SanFrancisco C10 ...5.80
SparrowsPoint,Md. B2...4.95
Sterling,Ill.(1) N15 ....4.85
Struthers,O. Y1 .....4.85
Torrance,Calif. C11 ....5.80
Waukegan,Ill. A7 .....4.85
Worcester,Mass. A7, T6..5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6 .....6.20
Buffalo W12 .....6.35
Cleveland A7 .....5.85
Crawfordsville,Ind. M8..6.20
Detroit D2 .....6.20
Dover,O. G6 .....6.20
Fostoria,O. S1 .....6.00
Kokomo,Ind. C16 .....5.70
FranklinPark,Ill. T6 ...6.20
Massillon,O. R8 .....5.85
Monessen,Pa. P16 .....5.85
Monessen,Pa. P7 .....6.10
NewHaven,Conn. D2 ...6.50
Pawtucket,R.I.(12) N8..6.85
Trenton,N.J. R5 .....6.15
Worcester A7 .....6.15
Worcester T6 .....6.50
Worcester W12 .....6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4 ..8.90
Buffalo W12 .....8.90
Chicago W13 .....8.90
Cleveland A7 .....8.90
Crawfordsville,Ind. M8..8.95
Fostoria,O. S1 .....8.90
Johnstown,Pa. B2 .....8.90
Kokomo,Ind. C16 .....8.90
Monessen,Pa. P16 .....8.90
Palmer,Mass. W12 .....9.20
Portsmouth,O. P12 .....8.90
Roebling,N.J. R5 .....9.20
Waukegan,Ill. A7 .....8.90
Worcester,Mass. A7, T6..9.20

WIRE, Galv'd ACSR For Cores

Bartonville,Ill. K4 .....8.50
Monessen,Pa. P16 .....8.50
Roebling,N.J. R5 .....8.80
SparrowsPoint,Md. B2...8.60
Johnstown,Pa. B2 .....8.50

WIRE, Tire Bead

Bartonville,Ill.(1) K4..10.90
Monessen,Pa. P16 .....11.40
Roebling,N.J. R5 .....11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....6.25
Alton,Ill.(1) L1 .....6.25
Bartonville,Ill.(1) K4 ..6.25
Buffalo W12 .....6.25
Cleveland A7 .....6.25
Donora,Pa. A7 .....6.25
Duluth A7 .....6.25
Fostoria,O. S1 .....6.25
Johnstown,Pa. B2 .....6.25
LosAngeles B3 .....7.20
Milbury,Mass.(12) N6 ..8.05
Monessen,Pa. P7, P16...6.25
Palmer,Mass. W12 .....6.55
Pittsburg,Calif. C11 ....7.20
Roebling,N.J. R5 .....6.55
Portsmouth,O. P12 ....6.25
So.Chicago,Ill. R2 .....6.25
So.SanFrancisco C10....7.20
SparrowsPoint,Md. B2..6.35
Struthers,O. Y1 .....6.25
Trenton,N.J. A7 .....6.55
Waukegan,Ill. A7 .....6.25
Worcester A7, T6, W12..6.35
Worcester,Mass. J4 ....6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....5.90
Alton,Ill.(1) L1 .....5.90
Buffalo W12 .....5.90
Cleveland A7 .....5.90
Donora,Pa. A7 .....5.90
Duluth A7 .....5.90
Johnstown,Pa. B2 .....5.90
LosAngeles B3 .....6.85
Monessen,Pa. P7, P16...5.90
NewHaven,Conn. A7 ....6.20
Palmer,Mass. W12 .....6.20
Pittsburg,Calif. C11 ....6.85
Portsmouth,O. P12 ....5.90
Roebling,N.J. R5 .....6.20
So.Chicago,Ill. R2 .....5.90
So.SanFrancisco C10....6.85
SparrowsPoint,Md. B2 ..6.00
Torrance,Calif. C11 ....6.85
Trenton,N.J. A7 .....6.20
Waukegan,Ill. A7 .....5.90
Worcester,Mass. A7 ....6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2 ...126
Ala.City,Ala.,17-18ga.R2 213
Aliquippa,Pa.9-14½ga.J5 130
Atlanta A11 133
Bartonville,Ill.(19) K4 ..130
Crawfordsville,Ind. M8 ..132
Donora,Pa. A7 130
Duluth A7 130
Fairfield,Ala. T2 130
Houston,Tex. S5 138
Johnstown,Pa. B2 130
Johnstown,17ga.,6" B2 ..204
Johnstown,17ga.,4" B2 ..207
Joliet,Ill. A7 130
KansasCity,Mo. S5 142
Kokomo,Ind. C16 132
Minnequa,Colo. C10 138
Monessen,Pa. P7 135
Pittsburg,Calif. C11 153
Portsmouth,O.(18) P12 ..137
Rankin,Pa. A7 130
So. Chicago,Ill. R2 126
Sterling,Ill.(1) N15 130

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2	140
Duluth A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago R2	140
Tonawanda B12	140
Williamsport,Pa. S19	150

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	143
Crawfordsville M8	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville M8	132
Donora,Pa. A7	123
Duluth A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburgh,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2 ...6.10
Bartonville,Ill.(19) K4..5.95
Crawfordsville,Ind. M8..6.30
Donora,Pa. A7 .....5.95
Duluth A7 .....5.95
Johnstown,Pa. B2 .....5.95
Joliet,Ill. A7 .....5.95
Kokomo,Ind. C16 .....6.05
Minnequa,Colo. C10 ....6.20
Pittsburg,Calif. C11 ....6.90
Portsmouth,O. P12 .....6.25
Rankin,Pa. A7 .....5.95
So.Chicago,Ill. R2 .....6.10
SparrowsPoint,Md. B2 ..6.05
Sterling,Ill.(1) N15 ....5.65
Worcester,Mass. A7 ....6.25

NAILS, Cut (100 lb keg)
To dealers (33)

Conshohocken,Pa. A3...$7.35
Wheeling,W.Va. W10 ...7.15

NAILS & STAPLES, Stock
To dealers & mfrs. (7)

	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. M8	122
Donora,Pa. A7	118
Duluth A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1..6.15
KansasCity,Mo. S5 .....6.40
Lebanon,Pa. B2 .....6.15
Minnequa,Colo. C10 ....6.15
Pittsburgh J5 .....6.15
Seattle B3 .....6.65
So.Chicago,Ill. R2 .....6.15
Struthers,O. Y1 .....6.15
Youngstown R2 .....6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5 .....9.85
Lebanon,Pa.(32) B2 ...9.85
Minnequa,Colo. C10 ....9.85
Pittsburgh O3, P14 .....9.85
Seattle B3 .....10.10

TIE PLATES

Fairfield,Ala. T2 .....4.50
Gary,Ind. U5 .....4.50
Ind.Harbor,Ind. I-2 ....4.50
Lackawanna,N.Y. B2 ..4.50
Minnequa,Colo. C10 ....4.50
Pittsburg,Calif. C11 ....4.65
Seattle B3 .....4.65
Steelton,Pa. B2 .....4.50
Torrance,Calif. C11 .....4.65

JOINT BARS

Bessemer,Pa. U5 .....4.70
Fairfield,Ala. T2 .....4.70
Ind.Harbor,Ind. I-2 ....4.70
Joliet,Ill. U5 .....4.70
Lackawanna,N.Y. B2 ..4.70
Minnequa,Colo. C10 ....4.70
Steelton,Pa. B2 .....4.70

AXLES

Ind.Harbor,Ind. S18 ....5.60
Johnstown,Pa. B2 .....5.60

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...(16)	4.00
Lackawanna B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	23.00	13.5W,4Cr,3V	140.00
Extra Carbon	27.00	18W,4Cr,2V,9Co	217.50
Spec. Carbon	32.50	19W,4Cr,2V,7Co	217.50
Oil Hardening	35.00	18.25W,4.25Cr,IV,4.75Co	185.50
Cr Hot Wrk	35.00	20.25W,4.25Cr,1.6V,12.25Co	323.00
Hi-Carbon-Cr	63.50	1.5W,4Cr,1V,8.5Mo	78.50
18W,4Cr,1V	123.50	6.4W,4.5Cr,1.9V,5Mo	87.00
18W,4Cr,2V	138.00	6W,4Cr,3V,6Mo	109.50

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RellanceDiv.,EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield, S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

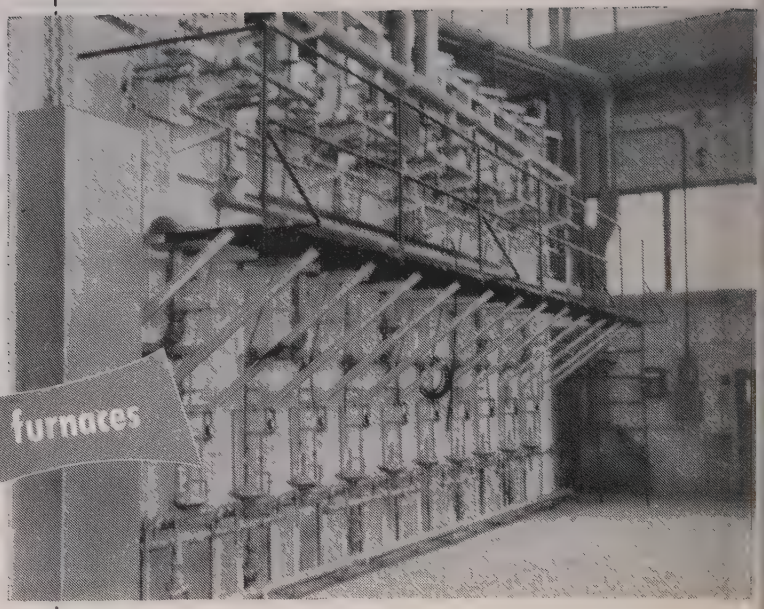
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c,finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

. . . for Steam and High Pressure POWER PIPING, *Midwest Piping and Supply Company*

. . . relies on versatile GAS-fired furnaces *for its specialized jobs*



Midwest's new annealing furnace. The charge (to a maximum of 40,000 lbs.) is automatically heat-treated with GAS. Built in five zones, it is equipped with an adjustable bulkhead to decrease its length, and its heating costs, when short charges are annealed.

SPECIAL FABRICATED PIPE PRODUCTS for power and high-pressure stations, for oil refineries, and other installations using non-standard parts, require tailor-made heating equipment in the production-line. All furnaces at Midwest Piping and Supply Company, St. Louis, Mo., are GAS-fired for economy and flexibility.

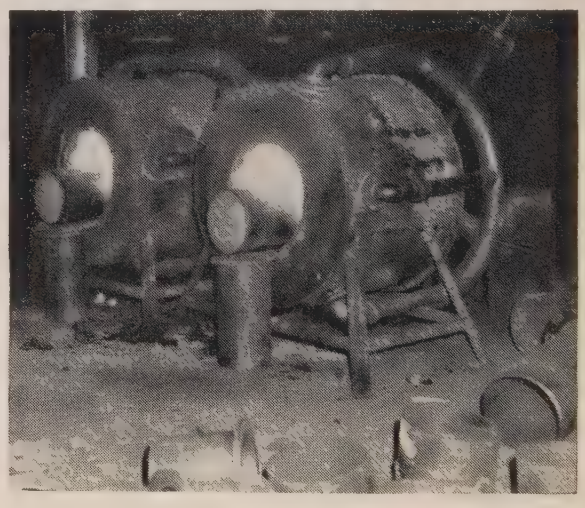
The Van Stone furnaces are one example. Eight Gas-fired forging furnaces and a 16-ft.-long pipe bending furnace are also in operation. In the latter, pipe up to 30″ in dia. is heated to 1800° for table bending.

After shaping, the members are welded together, and are given an annealing operation to obtain the metallurgical properties desired in the finished product. Midwest's flexible Gas-fired annealing furnace permits a wide variety of time and temperature cycles. Its forty low-pressure nozzle mixing burners can be pre-set for "Program Control." Carbon, stainless and chrome steels are annealed at 1350° F, 2000° F and 1550° F respectively, with a maximum variation of 25° F.

AVERAGED STATISTICS FOR PROGRAM-CONTROLLED HEAT TREATING OPERATIONS USING 1000 BTU/ft³ GAS.

Temp. Range of Heat (°F)	Avg. Wt. Per Load (Lb.)	Heating Time (Hrs.)	Soaking Time (Hrs.)	Cooling Time (Hrs.)	Gas Consumption (MCF)
1200 to 1400	17,600	4.5	1	.5	44.5
1500 to 1600	14,700	5.5	2	5.5	75.3

Whether you fabricate special work or produce standard parts in which heating or heat-treating is required, GAS will help you do it economically, easily, quickly. Your Gas Company Representative has the facts. Call him today.



Portable, handy GAS-fired Van Stone furnaces heat pipe ends for flanging. The five burners surrounding each furnace give temperatures up to 2000° F.

MORE AND MORE... THE TREND IS TO GAS FOR ALL INDUSTRIAL HEATING

AMERICAN GAS ASSOCIATION

420 Lexington Avenue, New York 17, New York

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	29.0	1.5	+0.5	+3.5
¼	6.0	0.42	28.5	26.5	23.5	+1.0	+3.0	+6.0
⅜	6.0	0.57	23.5	21.5	18.5	+7.0	+9.0	+12.0
½	8.5	0.85	36.0	34.0	35.0	14.0	12.0	13.0
¾	11.5	1.13	39.0	37.0	38.0	18.0	16.0	17.0
1	17.0	1.68	41.5	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	42.0	44.0	41.0	22.0	24.0	21.0
1½	27.5	2.78	42.5	41.5	41.5	23.0	21.5	22.0
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	43.5	41.5	42.5	24.0	22.0	23.0
3	76.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y1; Alton, Ill. (Gary base) L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 3½% on ⅛", plus 2½% on ¼", plus 9% on ⅜"; Sharon, Pa. M6, plus 0.5 on ⅛", 1 point lower on ⅛", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 16½% on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ¾", 2 points lower on 1", 1½ points lower on 1¼", 2 points lower on 1½" and 2", 1½ points lower on 2½" and 3"; Etna, Pa. N2 and 18½% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	12.5	32.5	12.5
3	76.5	7.62	32.5	12.5	32.5	12.5
3½	92.0	9.20	34.5	14.5	34.5	14.5
4	$1.09	10.89	34.5	14.5	34.5	14.5
5	1.48	14.81	37.0	17.0	37.0	17.0
6	1.92	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1¼ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10%	Strip Cold-Rolled Carbon Base Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Cu Base Both Sides
302	....	....	....	....	19.75	27.50	77.00
304	25.00	28.00–29.50	....	....	20.75–24.50	27.50	77.00
309	30.50	35.00	....	....	....	....	....
310	36.50	41.00	....	....	....	....	144.00
316	29.50	31.50–34.00	....	....	26.00	36.50	....
317	34.50	39.00	....	....	....	....	....
318	38.50	38.00	....	....	....	....	....
321	26.50	31.00	....	....	23.00	33.00	111.00
347	27.50	30.50–32.00	....	....	24.00	33.50	130.00
405	21.25	27.75	....	....	....	....	....
410	20.75	27.25	....	....	....	....	....
Nickel	33.25	44.25	41.00	54.00	....	....	....
Inconel	41.00	53.50	....	....	....	....	165.00
Monel	34.75	45.75	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, monel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	15
⅝-in. & ⅞-in.	18.5
1-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, al diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap, and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

	Reg. Heavy
H.P. & C.P. Square:	
½-in. & smaller	15 15
⅝-in. & ⅞-in.	12 6.5
1-in.-1½-in.	9 1
1⅝ in. & larger	7.5 1
H.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ⅞-in.	16.5 6.5
1-in.-1½-in.	12 2
1⅝-in. & larger	8.5 2
C.P. Hex.	
½-in. & smaller	26 22
⅝-in. & ⅞-in.	23 17.5
1-in. & 1½-in.	19.5 12
1⅝-in. & larger	12 6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or key quantities)

	Reg. Hvy.
½-in. & smaller	35 28.5
⅝-in. & ⅞-in.	29.5 22
1-in.-1½-in.	24 15
1⅝-in. & larger	13 8.5
	Light
½-in. & smaller	35
⅝-in. to ⅞-in.	28.5
1-in. to 1½-in.	26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish ....48 & 10
Plated finishes ...31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
¾-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 7.85c
⅞-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..List to list-plus-50c.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Inches Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
4.5⅛	40	21.50
3	40	22.61
2½	24,30	23.15
2	24,30	25.36
	CARBON	
40	100,110	8.03
35	100,110	8.03
30	84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03
14	60,72	8.57
10,12	60	8.84

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	41.00	34.00	31.25
302...	41.00	36.50	31.25
303...	43.00	40.00	33.75
304...	43.00	38.50	32.75
309...	55.50	54.50	44.25
316...	56.50	58.50	48.75
321...	49.00	48.00	36.75
347...	53.50	52.00	41.25
410...	36.50	30.50	25.75
416...	37.00	37.00	26.25
420...	44.00	47.00	31.25
430...	39.00	31.00	26.25
501...	27.50	26.00	14.25
502...	28.50	27.00	15.25

Baltimore, Types 301 through 347 sheet, except 309 E2.
Brackenridge, Pa., sheets A4.
Bridgeville, Pa., bars, wire, sheets & strip U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.
Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502, S18.
Cleveland, strip A7.
Detroit, strip, except Types 309, 321, 416, 420, 501 and 502 M1.
Dunkirk, N.Y., bars, wire A4.
Duquesne, Pa., bars U5.
Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6.
Gary, Ind., sheets except Type 416 U5.
Harrison, N. J., strip C18.
McKeesport, Pa., bars, sheets except Type 416 U5.
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.
Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars U5.
Pittsburgh, sheets C18.
Reading, Pa., bars and strip, except 55.50c for Type 309 strip and 44.75c for Type 309 bars, C4.
Sharon, Pa., strip, except Types 303, 309, 316, 416, 501 and 502 S3.
So. Chicago, Ill., bars & structurals U5.
Syracuse, N. Y., bars, wire & structurals C18.
Titusville, Pa., bars, U4.
Wallingford, Conn., strip, except 309, W2 quotes 0.25 cents higher.
Washington, Pa., bars, sheets & strip, except Type 309 sheets 56.00c and bars 44.75c, J3.
Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 61.50c, strip 63.00c, W4.
Watervliet, N. Y., structurals & bars A4.
Waukegan, bars & wire A7.
West Leechburg, Pa., strip, A4.
Youngstown, strip, except Types 303, 3099, 316, 416, 501 and 502 C8.

COAL CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 30.00-35.00
Toluol, one deg...26.00-33.00
Industrial xyiol ..25.00-33.50
Per ton bulk, ovens
Sulphate of ammonia .$32-$45
Cents per pound, ovens
Phenol, 40 (carlots, non-returnable drums) ..17.25
Do., less than carlots..18.00
Do., tank cars 15.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge iron	Cents
98+% Fe, carlots	16.00
Swedish, c.i.f. New York, in bags	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 tons	50.00
Copper:	
Electrolytic	43.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	83.00
Nickel-Silver, 10-ton lots	44.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainles Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50
Tungsten:	Dollars
99%, minus 80 to 200 mesh, freight allowed:	
1000 lb and over	4.00
Less than 1000 lb	4.15
98.8% minus 65 mesh, freight allowed:	
1000 lb. and over	4.15
less than 1000 lb.	4.25
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb.	2.85
200 to 500 lb.	3.10
less than 200 lb.	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

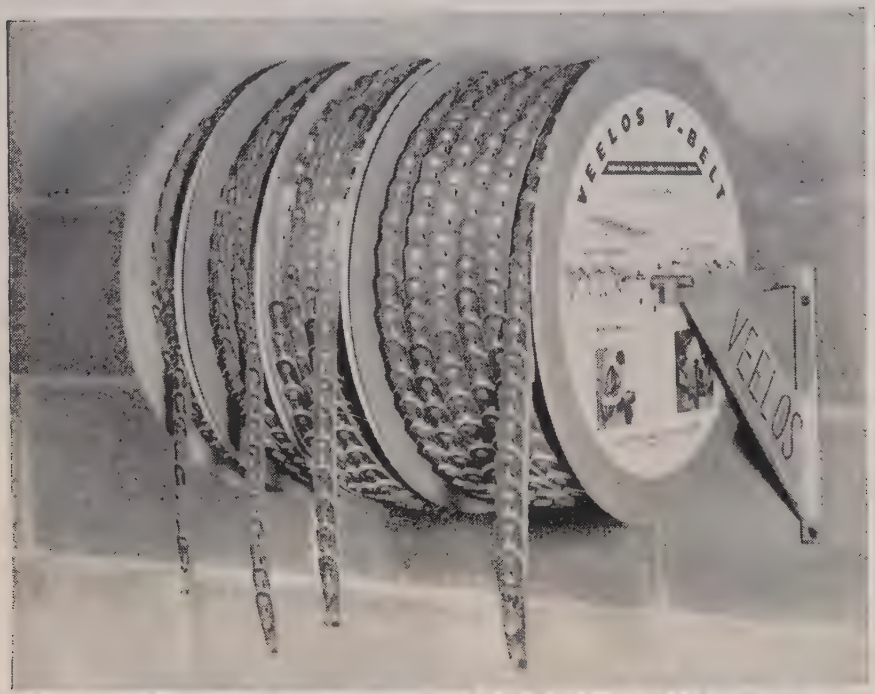
Connellsvll,fur. ..$14.50-15.00
Connelsvll,fdry. .17.00-18.00
New River, foundry...21.30
Wise county, foundry..15.95
Wise county, furnace..15.20

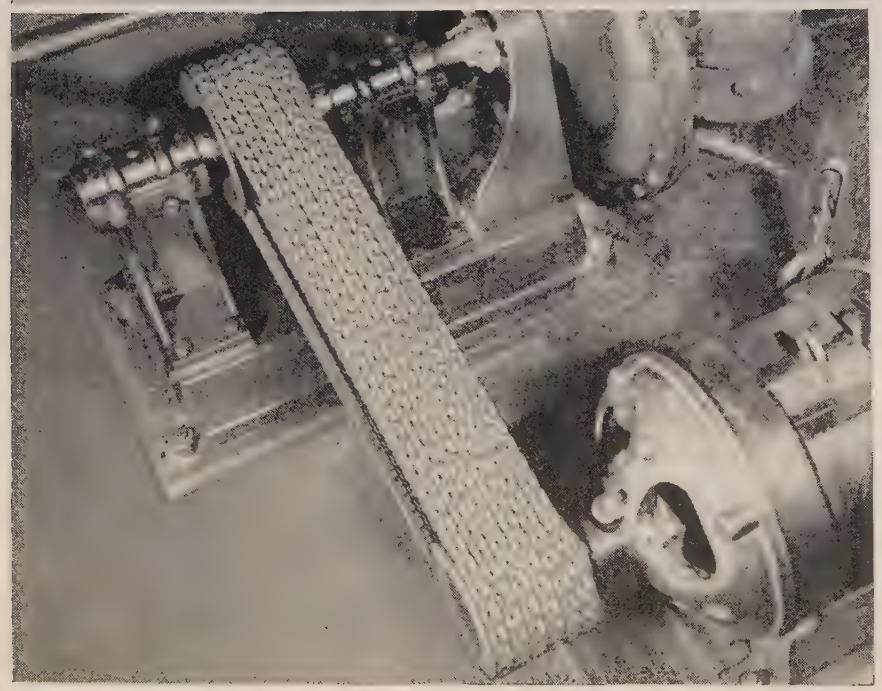
OVEN FOUNDRY COKE

Kearney, N. J., ovens.$22.75
Everett, Mass., ovens New England, del...*24.80
Chicago, ovens 23.00
Chicago, del. 24.40
Terre Haute, ovens....22.50
Milwaukee, ovens 23.75
Indianapolis, ovens ...22.75
Chicago, del. 26.28
Cincinnati, del. 25.73
Detroit, del. 26.71
Ironton, O., ovens 22.50
Cincinnati, del. 25.12
Painesvile, O., ovens..24.00
Cleveland, del. 25.75
Erie, Pa., ovens 23.50
Birmingham, ovens ...20.30
Birmingham, del. ...21.69
Philadelphia, ovens ...22.70
NevilleIsland,Pa.,ovens 23.00
Swedeland, Pa., ovens..22.60
St. Louis, ovens
St. Louis, del. 25.40
Portsmouth, O., ovens..22.50
Cincinnati, del. 25.12
Detroit, ovens 24.00
Detroit, del. 25.00
Buffalo, del. 26.75
Flint. del. 26.49
Pontiac, del. 25.42
Saginaw, del. 26.81

* Or within $4.15 freight zone from works.

Veelos—the Adjustable V-Belt Pays for Itself





In Inventory . . .

Veelos pays for itself by reducing re-q quired v-belt stocks. Just 4 reels of Veelos cover *every* v-belt need (up to 316 sizes) in the O, A, B and C widths. Stock only one reel for each width of belt you use—and *any length is readily available.*

In Maintenance . . .

Veelos pays for itself because it can be installed quickly and easily without dis-mantling outboard bearings or moving motor. Individual belts can be adjusted by simply removing or adding links.

In Operating Efficiency . . .

Veelos pays for itself because uniform tension can be maintained on all belts to provide vibrationless, full power delivery. Simple adjustment of each belt means that *matched sets stay matched.*

Write for your copy of the Veelos Data Book. It gives the complete story on why *Veelos pays for itself.*

MANHEIM MANUFACTURING & BELTING COMPANY
Manheim, Pennsylvania

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types; regular, oil-proof and static conducting. Also double V in A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. Veelos is known as VEELINK outside the United States.

VEELOS
THE LINK
V-BELT

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York (c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††[5]	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††[5]	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.32
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City (city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity (w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90[2]	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm, (w'hse)	5.60	6.40	6.75[2]	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05[2]	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85[2]	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.80[4]	8.90[2]	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60[2]	9.20[2]	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded; ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [4]—3500 lb and over; [5]—1000 to 1999 lb.

ORES

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports. After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E. Pa.

Foundry and basis 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Indian manganese, 46-48%, nearby, 92.00-96.00c per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.8c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.00c per lb of contained Si; packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.5c per lb of contained Si, carload packed 18.7c, ton lot 19.65c, less ton 20.7c. Delivered. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe.) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 200 to 1999 lb 11.65c, smaller lots 12.15c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

TUNGSTEN ALLOYS*

Ferrotungsten: (70-80%). 10,000 lb W or more, $5.00 per lb of contained W 2000 lb W to 10,000 lb W, $5.10; less than 2000 lb W, $5.22.

Tungsten Powder: Carbon Reduced; (W 98.8% min.) 1000 lb or more, $6.00 per lb of contained W; less than 1000 lb W, $6.15.

**Government ceiling prices, effective May 7, 1951, f.o.b. Niagara Falls, N. Y., basis.*

NOTE: Current prices on manganese, titanium and chromium alloys appeared on page 171. June 4 issue; calcium, vanadium, zirconium, briquetted alloys and "other" ferroalloys, page 125, May 28 issue.

REFRACTORIES

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Hayward, Ashland, Ky., Clearfield, Curwensville, Pa., Ottawa, Ill., $116.60. Hard-fired, St. Louis, Vandalia, Mo., Olive Hill, Ky., $156.20.

High-Heat Duty: Salina, Pa., $99.60. Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, Curwensville, Lumber, Lockhaven, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Ky., Troup, Athens, Tex., Stevens Pottery, Ga., Bessemer, Ala., Portsmouth, Oak Hill, O., Ottawa, Ill., $94.60.

Intermediate-Heat Duty: St. Louis, Farber, Vandalia, Mo., West Decatur, Orviston, Beach Creek, Curwensvile, Lumber, Lockhaven, St. Marys, Clearfield, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Hayward, Ky., Athens, Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $88; Bessemer, Ala., $79.20.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., $79.20; Parral, O., $78.50; St. Marys, Pa., $76; Ottawa, Ill., $70.

Ladle Brick

Dry Press: Chester, New Cumberland, W. Va., Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., $66.

Wire Cut: Chester, Wellsville, O., $64.

Malleable Bung Brick

St. Louis, Vandalia, Farber, Mo., Olive Hill, Ky., $105.60; Beach Creek, Pa., $94.60; Ottawa, Ill., $90.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $94.60; Hays, Pa., $100.10; Joliet, Rockdale, Ill., E. Chicago, Ind., $104.50; Lehi, Utah, Los Angeles, $111.10.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $92.40.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $93.50.

Basic Brick

Per net ton, Baltimore or Chester, Pa. Burned chrome brick, $73-$78; chemical-bonded chrome brick, $77-$82; magnesite brick, $99-$104; chemical-bonded magnesite, $88-$93.

Magnesite

Per net ton, Chewelah, Wash. Domestic deadburned, ⅜" grains; bulk, $36.30; single paper bags, $41.80.

Dolomite

Per net ton. Domestic burned bulk; Bonne Terre, Mo., $12.15; Martin, Millersville, Nario, Clay Center, Woodville, Gibsonburg, Bettsville, O., Billmeyer, Plymouth Meeting, Blue Bell, Wiliams, Pa., Millville, W. Va., $13.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Apr. 19, 1951

STEELMAKING SCRAP COMPOSITE

June 7	$44.00
May 24	44.00
May 1951	44.00
June 1950	39.25
June 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

No. 1 Heavy Melting Steel (Grade) 1

Basing Point	Dealer, Industrial	Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 2 Heavy Melting	—$2.00
3. No. 1 Busheling	Base
4. No. 1 Bundles	Base
5. No. 2 Bundles	— 3.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	+ 2.00
21. 1 foot and under	+ 4.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	— 3.00
24. Heavy Turnings	— 1.00

Special Grades

25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.
(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.
(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.
(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces or foundries.
(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.
(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.
(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $15.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy Melting Steel	—$2.00
3. No. 2 Steel Wheels	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats.	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, switches.	Base
10. Flues, Tubes & Pipes.	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under.	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.
(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.
(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery.	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 3 cast iron.
(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.
(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3.
(4) For preparing into Grade No. 25, $6.
(5) For preparing into Grade No. 19, $6.
(6) For preparing into Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) For preparing into Grade No. 17 or Grade No. 21, $11.
(8) For preparing into Grade No. 18 or Grade No. 20, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:
(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
(3) For preparing into Grade No. 16, $4.
(4) For preparing into Grade No. 17, $5.
(5) For preparing into Grade No. 18, $7.
(6) For preparing into Grade No. 21, $4.
(7) For preparing into Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:
(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commissions shall be payable to a broker in excess of $1.

Unprepared Scrap

For unprepared scrap, other than materials suitable for hydraulic compression, ceiling basing point prices shall be $8 per ton beneath ceiling of the prepared base grades.

For unprepared material which when compressed constitutes No. 1 bundles, ceiling basing point price shall be $6 per ton beneath ceiling for No. 1 bundles; or when compressed constitutes No. 2 bundles ceiling basing point price shall be $8 beneath ceiling basing point price for No. 2 bundles.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.
Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.
Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.
Coatesville, Pa., 50c; Conshohocken, Pa., 20c.
Detroit, 95c; Duluth, Minn., 50c.
Harrisburg, Pa., 51c; Houston, Tex., 57c.
Johnstown, Pa., 75c.
Kansas City, Mo., 78c; Kokomo, Ind., 51c.
Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.
Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.
St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.
Warren, Pa., 75c; Weirton, W. Va., 70c.
Youngstown, 75c.

HAMILTON, ONT.
(Delivered Prices)

Heavy Melt.	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	34.50
Mechanical Bundles	33.00
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	28.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory, prep'd	33.00
Bushelings new factory, unprep'd	28.00
Short Steel Turnings	28.00
Cast Iron Grades*	
No. 1 Machinery Cast	58.00-60.00

* F.o.b. shipping point.

The Metal Market

Producers of civilian goods will receive smaller tonnages of major nonferrous metals next quarter as defense and defense-supporting programs continue to expand

NATIONAL Production Authority is tightening its controls over the use of strategic metals to conserve supplies for the defense mobilization program and to assure a continued supply for important civilian requirements. No relief from copper shortages can be foreseen by NPA officials before the end of 1952 or first half of 1953. The outlook for several other major nonferrous metals is equally unfavorable.

Only about 20 per cent of total supply of nickel is earmarked for nondefense uses. Nickel suppliers must furnish producers of alloy and stainless steels 15 per cent of the producers' receipts during the base period (Jan. 1-June 30, 1950) to meet nonrated orders.

None for Civilians—If you are a producer of civilian goods, the only aluminum that will be available to you during the next few months probably will have to come from inventories, imports, and scrap or secondary metal. Defense and defense - supporting programs plus stockpiling will take about 80 per cent of primary aluminum production in June. Under CMP, these requirements plus those under special directives will take practically all of output in July.

In a move to further conserve supplies of copper, aluminum, zinc, chromium and nickel, NPA issued order M-65 to effect the recovery of obselete metal printing plates. The order limits the time such plates can be held by various types of printing establishments.

The agency moved to conserve aluminum by limiting the use of aluminum foil in packaging. Order M-67, effective June 1, limits the amount of aluminum foil to 0.005 inch thick or less which a manufacturer may use in protective packaging. This action is expected to save an estimated 9 million pounds of aluminum foil in addition to the savngs already effected by order M-7, which reduced overall foil use from the 1950 level of 68 million pounds to the current 44 million-pound annual rate.

The practice of toll agreements between fabricators and owners for processing scrap into unalloyed copper will be forbidden after Aug. 1 in a proposed amendment to order M-16.

With the implementation of CMP on July 1, defense rated orders will continue through the third quarter, along with CMP allotments. The latter will have precedence, but it will be necessary to continue the DO orders until they are converted.

U. S. Cuts Metal Tariffs

United States import tariffs on several hundred different commodities were reduced June 6. These reductions were agreed upon at the International Tariff Conference at Torquay, England, which ended in April. Tariffs were cut to 1 1/16 cents from 2⅛ cents a pound of lead content in lead bullion, pigs and bars; to 3/5-cent from ¾-cent a pound of zinc content in zinc ores; to 7/10-cent from ⅞-cent a pound of zinc content in blocks, pigs or slabs; to 1½ cents from 2 cents on crude aluminum; to 12.5 per cent from 25 per cent by value on barium, boron, strontium, thorium and vanadium.

STEEL'S Metal Price Averages for May, 1951

(Cents per pound)

Electrolytic Copper, del. Conn.	24.500
Lead, St. Louis	16.800
Prime, Western Zinc, E. St. Louis	17.500
Straits Tin, New York	139.923
Primary Aluminum ingots, del.	19.000
Antimony, f.o.b. Laredo, Tex.	42.000
Nickel, f.o.b. refinery	50.500
Silver, New York	90.160

Zinc Scrap Prices Reduced

Prices of zinc scrap were rolled back by the government to levels substantially below those previously prevailing. OPS established price ceilings are based on a price of 12.25c a pound for unsweated zinc dross at point of shipment. Nine specific price ceilings were listed in regulation No. 43, ranging from 9.50c for old die cast scrap to 14.50c for new zinc clippings and trimmings and engravers' and lithographers' plates.

The order was effective June 6 and dealers may carry out existing contracts at higher prices than those set in the order until June 13.

The basic grade of unsweated zinc dross accounts for about 80 per cent of total tonnage consumed, OPS said.

New Standard Conserves Zinc

Use of a new emergency standard involving a thinner coating of zinc for galvanized conduits has resulted in a 35 per cent saving of that metal on such equipment, says the National Production Authority.

Aluminum Imports Allocated

Users of aluminum are drawing on foreign sources to help alleviate the shortage in this country. Imports of aluminum ingots, scrap and finished products this year are heavy but probably will be somewhat below the 1950 total of 255,957 tons which was exceeded only in 1945 when 339,293 tons were imported. Aluminum Import Corp., which is closely connected with Aluminum Co. of Canada as well as with Swiss and British producers and fabricators, is allocating its tonnages of imported metal.

Steps are being taken to increase production abroad, especially in Canada. Aluminum Ltd. is spending $220 million to increase integrated Canadian capacity 150,000 metric tons, bringing total usable capacity over the 550,000-ton mark. About 45,000 tons of new capacity will be available in 1952 while the balance will require about three years of construction work.

DESTINATION UNKNOWN: Other metal cargoes besides iron and steel are handled at Cleveland's river front terminal. Here 500 tons of Alcan aluminum bars are unloaded from the S. S. Cartierdoc of Patterson Steamship Lines, Canada, at Cleveland Stevedore Co.'s river front terminal

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c. Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 29.00c; 88-10-2 (No. 215) 44.50c; 80-10-10 (No. 305) 35.00c; No. 1 yellow (No. 405) 25.50c.

Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.85c, delivered.

Lead: Common 16.80c; chemical 16.90c; corroding 16.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 30.75-32.50c; No. 12 foundry alloy (No. 2 grade) 30.75-31.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 32.75-33.50c; grade 2, 30.00-31.50c; grade 3, 30.00-30.50c; grade 4, 28.50-30.00c. Prices include freight at c.l. rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 136.00.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, large lots, New York, $211-$215 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.10 per lb for 500 lb (kegs); $2.12 per lb for 100 lb (case); $2.17 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 90.16c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; effective May 23, 1951)

Sheet: Copper 40.18; yellow brass 37.28; commercial bronze, 95% 40.18; 90% 39.78; red brass, 85% 38.86; 80% 38.47; best quality, 38.07; nickel silver, 18%, 50.99; phosphor-bronze grade A, 5%, 59.42.

Rod: Copper, hot-rolled 36.03; cold-drawn 37.28; yellow brass free cutting, 31.70; commercial bronze, 95%, 39.87; 90%, 39.47; red brass 85%, 38.55; 80%, 38.16.

Seamless Tubing: Copper 40.22; yellow brass 40.29; commercial bronze, 90%, 42.44; red brass, 85% 41.77.

Wire: Yellow brass 37.57; commercial bronze, 95%, 40.47; 90%, 40.07; red brass, 85%, 39.15; 80%, 38.76; best quality brass, 38.36.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.295; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 30.10, l.c.l. 30.18, 100,000 lb lots 29.35; magnet, del., 15,000 lb or more 34.50, l.c.l 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	52.0	....	....
0.156-0.188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.00c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 37.69c; oval 37.19c. Cast 37.375c, delivered in eastern territory.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 60.8c, under 1000 lb 62.8c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98% ½-oz ball, in 200 lb drums, 1 to 900 lb, 19.00c; 1000 to 19,900 lb, 18.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 200 lb, 29.25c; over 200 lb 28.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 68.50c; 10,000 to 30,000 lb, 69.50c; 3000 to 10,000 lb, 70.50c, 500 to 3000 lb 71.50c; 100 to 500 lb, 73.50c; under 100 lb, 76.50c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 35.00c; 400-lb bbl. 33.00c up to 10,000 lb, 32.50c; over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, $1.52; 500 to 999 lb, $1.525; 200 to 499 lb, $1.53; less than 200 lb, $1.5454. Freight allowed east of Mississippi and north of Ohio and Potomac.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 49.40c; 100 or 600 lb drums only, 100 to 500 lb, 81.20c; 700 to 1900 lb, 78.90c; 2000 to 9900 lb, 77.30c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.2086; more than 2000 lb, $1.1886. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl. $1.0919; 100 lb kegs $1.1019. Freight allowed.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 20,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	23.00	23.00	22.25
Yellow Brass	20.125	19.875	18.75
Commercial Bronze			
95%	21.875	21.625	21.125
90%	21.75	21.50	21.00
Red Brass			
85%	21.50	21.25	20.75
80%	21.375	21.125	20.625
Muntz metal	19.00	18.75	18.25
Nickel, silver, 10%	22.25	22.00	11.125
Phos. bronze, A	24.00	23.75	22.75

BRASS INGOT MAKERS' BUYING PRICES

(Cents per lb, cl, delivered eastern refineries)

No. 1 copper 30.00; No. 2 copper 28.00; light copper 27.00; composition red brass 25.50-26.00; radiators 20.50-21.00; heavy yellow brass 20.00-20.50.

REFINERS' BUYING PRICES

(Cents per lb, cl, delivered refinery)

No. 1 copper 21.50*; No. 2 copper 20.00*; light copper 19.00*; refinery brass (60% copper) per dry copper content 20.00.

* Nominal.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 25.50-26.50; No. 2 24.00-25.00; light copper 22.00-22.50; No. 1 composition red brass 22.00-23.00; No. 1 composition turnings 21.00-22.00; mixed brass turnings 13.00; new brass clippings 20.00-21.00; No. 1 brass rod turnings 19.00; light brass 15.00; clean heavy yellow brass 17.50; new brass rod ends 19.50; auto radiators 17.50-18.00; cocks and faucets, 19.00-19.50; brass pipe 20.00-20.50.

Lead: Heavy 16.50-16.75; battery plates 9.50-10.00; linotype and stereotype 17.00; electrotype 16.00-16.25; mixed babbitt 17.00.

Tin: No. 1 pewter 80.00-85.00; block tin pipe 110.00-120.00; No. 1 babbitt 70.00-75.00.

Aluminum: Clippings 2S 21.50-22.00; old sheets 17.00-17.50; crankcase 17.00-17.50; borings and turnings 13.00-14.00.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

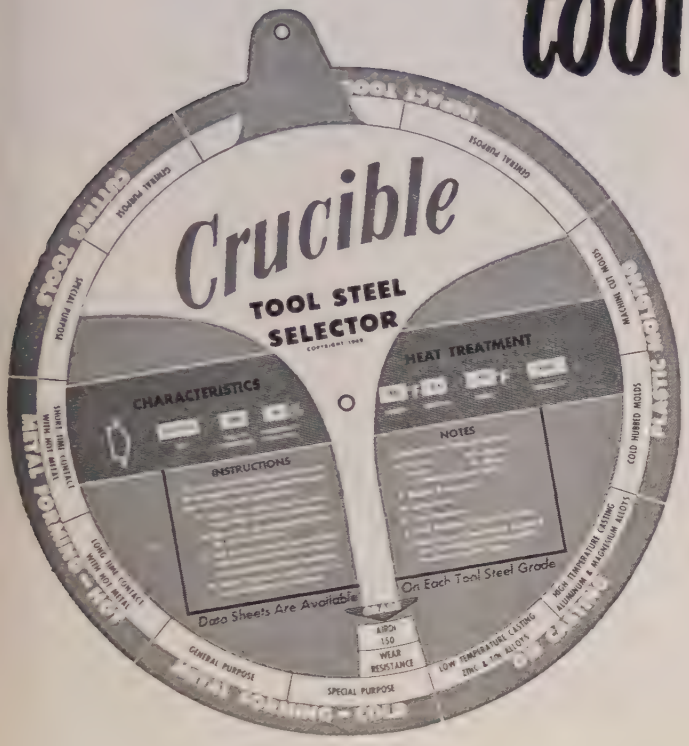
Unsweated zinc dross, 12.25; new clippings and trimmings, 14.50; engravers' and lithographers' plates, 14.50; die cast slabs, min. 90% zinc, 12.25; old zinc scrap, 11.25; forming and stamping dies, 11.25; new die cast scrap, 10.75; old zinc die cast radiator grills, 10.50; old die cast scrap, 9.50.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
June 1-7	24.50	16.80	17.50	136.00	19.00	42.00	56.50	90.16
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	50.50	90.16
May 10-31	24.50	16.80	17.50	139.00	19.00	42.00	50.50	90.16
May 1-9	24.50	16.80	17.50	142.00	19.00	42.00	50.50	90.16
Apr. 17-30	24.50	16.80	17.50	142.00	19.00	42.00	50.50	90.16
Apr. 12-16	24.50	16.80	17.50	147.00	19.00	42.00	50.50	90.16
Apr. 9-11	24.50	16.80	17.50	150.50	19.00	42.00	50.50	90.16
Apr. 6-7	24.50	16.80	17.50	150.00	19.00	42.00	50.50	90.16
Apr. 5	24.50	16.80	17.50	149.875	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.730	19.00	42.00	50.50	90.16
Feb. Avg.	24.50	16.80	17.50	182.716	19.00	42.00	50.50	90.16
Jan. Avg.	24.50	16.80	17.50	171.798	19.00	35.462	50.50	88.890

NOTE: Copper; Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime west, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

"no more GAMBLING on tool steel selection"



[⅓ actual size; Selector is in 3 colors]

Since the first announcement, hundreds of tool steel users have received their CRUCIBLE TOOL STEEL SELECTORS. The comments received indicate that this handy method of *picking the right tool steel right from the start* is going over big.

"Handiest selector I've ever seen"

"No more gambling on tool steel selection"

"You're right, the application should dictate the choice of the tool steel" . . . and many, many more favorable comments.

You'll want your CRUCIBLE TOOL STEEL SELECTOR. It uses the only logical method of tool steel selection—begin with the application to pick the right steel! And the answer you get with one turn of the Selector dial will prove satisfactory in every case, for the CRUCIBLE TOOL STEEL SELECTOR covers 22 tool steels which fit 98% of all Tool Steel applications. ALL the tool steels on the Selector are in Warehouse Stock . . . that means when you get the answer, you can get the steel . . . fast!

Write for your Selector today! We want you to have it, because we know you've never seen anything that approaches your tool steel problems so simply and logically. Just fill out the coupon and mail. Act now! CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

Here's how it works:

To use the Selector, all you need know is the characteristics that come with the job: type and condition of material to be worked, the number of pieces to be produced, the method of working, and the condition of the equipment to be used.

FOUR STEPS—and you've got the right answer!

1. Move arrow to major class covering application
2. Select sub-group which best fits application
3. Note major tool characteristics (under arrow) and other characteristics in cut-outs for each grade in sub-group
4. Select tool steel indicated

That's all there is to it!

Here's an example:

Application—Deep drawing die for steel

Major Class—Metal Forming—Cold

Sub-Group—Special Purpose

Tool Characteristics—Wear Resistance

Tool Steel—Airdi 150

One turn of the dial does it!

And you're sure you're right!!

Crucible Steel Company of America
Dept. S, Chrysler Building
New York 17, N. Y.

Gentlemen:

Sure! I want my CRUCIBLE TOOL STEEL SELECTOR!

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CRUCIBLE

first name in special purpose steels

TOOL STEELS

fifty-one years of Fine steelmaking

Branch Offices and Warehouses: ATLANTA • BALTIMORE • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DENVER • DETROIT HOUSTON, TEXAS • INDIANAPOLIS • LOS ANGELES • MILWAUKEE • NEWARK • NEW HAVEN • NEW YORK • PHILADELPHIA • PITTSBURGH • PROVIDENCE ROCKFORD • SAN FRANCISCO • SEATTLE • SPRINGFIELD, MASS. • ST. LOUIS • SYRACUSE • TORONTO, ONT. • WASHINGTON, D. C.

Plates . . .

Plate Prices, Page 145

Boston—Plate demand for small tanks includes more rated volume, but fabricating shops lack inventories. Non-directive tonnage in third quarter will be meager. For September delivery, part of 15,000 tons, directed for heating oil and gasoline tanks to 22 companies, is for East Hartford, Conn.

New York—Demand for heavy plates is increasing for industrial requirements, notably weldments.

Philadelphia—Not only is carbon plate production for most of third quarter subject to controlled distribution, but floor plate and clad material supply will be short. Clad plates are automatically affected by restrictions on cladding material.

Pittsburgh—Virtually no free plate tonnage is available for July. Directives have mounted and will take essentially the entire production here.

Seattle—Smaller plate shops report difficulty in competing for business in the face of steel and other raw material shortages. Larger fabricators hold large backlogs but they also are handicapped by lack of priorities for some projects.

Sheets, Strip . . .

Sheet and Strip Prices, Page 145 & 146

Cleveland—Cutbacks in steel supply to civilian durable goods are not expected to noticeably ease sheet and strip supply conditions over coming months. The freed tonnage will be quickly taken up on defense and related account. Right now pressure is rising for tonnage required for equipment and facility expansions. Third quarter steel use in consumer durable goods is to be held to 70 per cent of base period consumption. Automobiles have been removed from this list and are controlled under a separate regulation, M-68, which through steel use limitations will have the effect of cutting production of passenger automobiles in third quarter about 37 per cent under output in the like 1950 period.

Confronted with a 6 cents per pound increase in nickel prices, producers of stainless and other high nickel steel products are expected to effect upward adjustments in their price schedules.

Boston—If major suppliers of carbon hot strip maintain current deliveries to converters, prospects for 90 per cent of base period tonnage for third quarter are reasonably bright. Alloy tonnage is more doubtful. Substitution of straight chromium grade for nickel-chromium stainless has extended schedules for the former. Most flatware producers have made this change and others are experiencing some fabricating troubles with substitutes.

New York—While some flat-rolled consumers have attempted to advance schedules on rated tonnage already placed, volume moved forward is not impressive.

Philadelphia—Regulatory orders on production and distribution of steel for third quarter add up to tighter controls and less tonnage for non-defense metalworking shops.

Pittsburgh—Schedules have been set for July rolling and it is obvious non-rated consumers will not get much tonnage.

Cincinnati—District mills are announcing sheet allotments for July. Tonnage for rated needs is increased moderately over June.

St. Louis — Rated orders continue to take more of the cold-rolled sheet tonnage, cutting back non-essential consumers. Sheet shipments here hit an all-time high in May.

Los Angeles—Fabricators' sub-contract defense backlogs, growing at a fast pace, help insure steel receipts.

Steel Bars . . .

Bar Prices, Page 145

New York—Volume of unrated tonnage for July is meager. Where lead-time is more extended, involving alloys or special processing excepted, some producers are taking rated bar orders if delivery falls beyond third quarter; otherwise orders are held and consumers advised to get volume in under CMP. Practically all alloy volume is rated.

Boston—For defense and rated requirements steel bar consumers manage to get enough tonnage, subject to some delays, to meet contract obligations. But they are short of stock for civilian work. With some exceptions, forge shops notably, ratio between the two approximates 50-50. Defense work is increasing. Bolt and nut shops expect additional tonnage in third quarter, but will continue pinched for steel over the next four to six weeks.

Philadelphia—Carbon bar tonnage for July and August beyond rated and allocated orders will be nil. Outlook for September is no better.

Cleveland—Heavier set-aside tonnage on defense and related account will result in additional cuts in bar quotas to unrated accounts. Indications are defense requirements will continue to expand for some time to come, and that the amount of "free" tonnage for the general market will force further cuts in civilian goods output before any particular easing in supply conditions develops.

Chicago—Effective June 1 Inland Steel Co. revised its rail steel bar price downward from $4.75 to $4.50 per 100 pounds. The reduction applies to both merchant and reinforcing grades.

St. Louis—Further tightening in free tonnage of merchant bars is promised for third quarter.

Alloy Steel . . .

Washington—Sellers of primary nickel products and of rolling mill, foundry and similar products containing more than 5 per cent nickel may adjust their ceiling prices to reflect the increase of 6 cents per pound in the price of nickel. Under supplementary regulation 33 of GCPR, sellers of primary nickel products may increase their prices as determined under GCPR by 6 cents per pound of nickel content. Rolling mills and foundries will absorb up to $6 a ton on the nickel content of their products and pass on any increase in cost over that amount. The increase passed on would be absorbed at subsequent levels of manufacture before reaching the consumer at retail.

Structural Shapes . . .

Structural Shape Prices, Page 145

Washington — Establishment of a specific regulation setting ceiling prices on their products to supersede CPR 30 which now covers them is urged by members of the OPS Fabricated Structural Steel Shapes, Plates & Bars Industry Advisory Committee.

Tentative formula would regulate margins on the basis of dollars per ton obtained in the last quarter of 1950 on the contract most comparable to the one being priced. Committee members stress not only the difficulty of making necessary calculations and filing required data under CPR 30, but also the difficulty of arriving at a meaningful cost increase factor because of the variability of materials cost components.

Boston—Outside of three projects taking close to 35,000 tons, structural inquiry is slackening. Included are 15,000 tons, forge shop building.

New York—Structural tonnage for July beyond defense set-sides and warehouse needs is nil. Warehouse directive will take upwards of 20 per cent. Most optimistic alignment of production schedules indicates less than 20 per cent will be available for non-directive fabrication.

Philadelphia—Most structural fabricators are limiting estimates to rated inquiries. Some tonnage in backlogs are being converted to DO status.

Pittsburgh — Demand for light structurals does not reflect the restrictions on certain types of buildings. Any easing due to building bans by NPA is swallowed up in rated and industrial construction. Bridge inquiries are decreasing.

Chicago—Mill set-asides of structural shapes for DO orders and defense support programs have assumed such magnitude that free steel will be virtually nonexistent in July.

Los Angeles—Pressure for structurals is growing. Valuation of industrial construction in Los Angeles county for first four months of 1951 totaled $32,059,683 or 223 per cent higher than for like 1950 period.

Seattle — Structural fabricators hold substantial order backlogs. Supply prospects are cause for concern, however, and new commitments are made cautiously. Several major projects in Alaska are up for immediate award.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 145

Boston — Contracts approximating 4000 tons have been placed, including 3500 tons, 27 buildings, veterans' hospital, Brockton, Mass., with Joseph T. Ryerson & Son, Inc. Estimated, but unplaced tonnage is substantial, 3970 tons to be bought for several Central Artery sections, Boston. Although quotations are sometimes higher, low on concrete reinforcing bars in place usually is 10.00c per pound.

Los Angeles — Some fabricators, with DO backlogs higher by 150 per cent since January, and with huge backlogs in defense structures, manufacturing plants, bridges and freeways, have ceased bidding for new work.

Seattle—Demand for reinforcing

View of 14" —12"—10" Mild Steel Rod Mill

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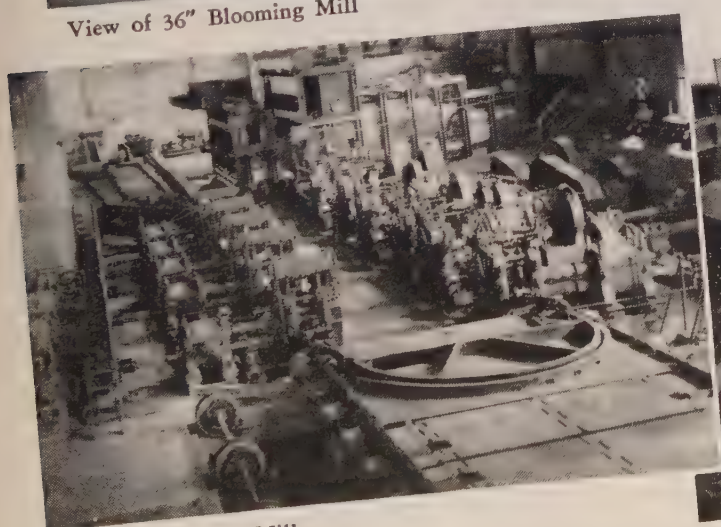
View of 36" Blooming Mill



View of 10" Strip Mill

View of Merchant Mill

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bars exceeds mill capacity and large tonnage orders are being declined by the mills.

Semifinished Steel . . .

Semifinished Prices, Page 145

Detroit—A new open hearth steel production record was established last month by Ford Motor Co. when its 10 furnaces turned out 116,702 tons. Ford's newest blast furnace also set a new record, producing 47,326 tons.

Tin Plate . . .

Tin Plate Prices, Page 146

Washington—More adequate supplies of tin plate for cans holding less than five gallons of powdered whole milk are provided for this year's pack. An amendment to order M-25 permits use of 0.25 tin plate for small powdered whole milk cans until July 31. Previously, use of tin plate for this purpose was restricted to one end of the can while the rest of the can was made of black plate. Dry, skimmed milk remains restricted to 0.25 tin plate for one end only in smaller than five gallon containers, and loses its preference A rating. Products containing a dry milk base are added to the list of baby foods with an unlimited tin plate preference A quota, but package specifications are limited to 0.25 tin plate for soldered, welded or non-soldered parts. The amendment also adds to the list of unlimited 0.50 tin plate items five-gallon or 50-pound containers for dietary dried milk base products, while small containers for these foods conform to the 0.25 tin plate specifications.

Tubular Goods . . .

Tubular Goods Prices, Page 149

Dallas, Tex.—Lone Star Steel Co. will market the steel pipe produced at its welded pipe mill, now under construction at Daingerfield, Tex., through established oil well supply houses. Production is expected late in 1952. The new mill will have an annual capacity of 350,000 tons.

Seattle — Several important cast iron pipe projects in Alaska are pending but sales agencies find it difficult to meet deliveries required by the Army. No large pipe tonnages are up for immediate bidding.

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Pig Iron . . .

Pig Iron Prices, Page 144

Cleveland—Continued tightening in merchant pig iron supplies is reported. So far in the emergency strict government control of supply has been avoided by judicious distribution by suppliers. However, with foreign iron supplies shrinking, and a number of blast furnaces scheduled to go out of production for necessary repairs, some trade authorities think closer government control of supplies is likely to come with a substantial spurt in defense requirements for castings in third quarter.

Boston—Pig iron suppliers may restrict deliveries to foundries over vacation periods where inventory warrants. But there are few cases of large stocks. Consumers are pressing for all the tonnage due them under contract with the Everett furnace.

New York—Increasing number of furnaces normally supplying part of merchant iron tonnage are down for repairs, tightening volume with critical period ahead for some foundries.

Buffalo—An expansion in DO contracts has further tightened the merchant p'g iron market. Shipments to Michigan motor casters are sustained but the movement of iron to the east coast is virtually nil.

Philadelphia — Stringency in pig iron will be enhanced by loss of one furnace supplying this area, going out July 1 for repairs.

Pittsburgh—Pig iron production continues at capacity, all 47 district stacks operating.

Youngstown—U. S. Steel Co. blew in its No. 5 blast furnace June 7. No. 5 stack is completely rebuilt and enlarged by 112,000 tons a year.

St. Louis — Tonnage of pig iron available to outside consumers in June will remain unchanged from May, according to Granite City Steel Co. which furnishes 90 per cent of the area's iron.

Seattle—Foundries have fair stocks of pig iron but future supply prospects are cause for concern. Domestic iron is practically unobtainable. Foreign iron prices are considerably above those on domestic grades.

Wire . . .

Wire Prices, Page 147

New York—More rigid controls of rod distribution through increased set-asides and fixed allocations to converters is tightening supply of carbon and alloy wire. After adjusting July schedules, producers in some cases are confronted with demands in excess of production with little or no unrated tonnage available.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 149

Pittsburgh — Metallurgical coke situation remains unchanged. Oven grades continue in short supply but distribution is such foundry and steel plant needs are satisfied. Beehive foundry coke should tighten slightly with the recently idle blast furnace here back in operation.

Cleveland—Oven foundry coke supply conditions are just a trifle easier in this area. Pressure for shipments is as great as ever but foundry inventories are reported slightly improved. This is accounted for by the fact New England oven coke has been coming into the district lately, as well as Connellsville beehive.

Some easing in demand pressure from the foundries is expected over the summer months.

St. Louis—Granite City Steel Co. has awarded Koppers Co., Inc., contract for a battery of 27 chemical-recovery coke ovens to be built at its Granite City, Ill., plant.

Iron Ore . . .

Iron Ore Prices, Page 151

New York—Bethlehem Steel Co. is reported to have purchased an additional 3400 acres of land near Morgantown, Pa. The company is rumored prospecting for iron ore in the area.

Cleveland — Iron ore shipments from upper lake ports totaled 12,664,095 gross tons in May, increase of 3,167,647 tons over the 9,496,448 tons shipped in May, 1950. The month's movement brought the cumulative total for the season to June 1 to 18,875,569 tons compared with only 9,845,252 tons in the like period a year ago.

Scrap . . .

Scrap Prices, Page 152

Pittsburgh—Crucible Steel Co. is the first district steel plant forced to cut operations due to lack of scrap. One open-hearth furnace at Midland, Pa., works is idle because supplies of scrap are inadequate. Earmarking of scrap by railroads and heavy industries keeps much scrap off the market. Collections are slow.

Boston—Movement of steel scrap to mills is below normal and consumer inventories are dangerously low in some cases. Allocations from dealer yards are of emergency nature, but most railroad and industrial scrap is going to steelworks direct. Dealers are paying more for light material, or $20 yards.

New York—Steel scrap inventories are low with consumers and yards. Allocations of railroad and larger industrial lots are frequent and also contribute toward limited yard supply. Price for No. 1 heavy melting steel, based on Bethlehem delivery by rail, holds at $36.99 shipping point. Most foundries need cast.

Buffalo—All three leading mill consumers report capacity ingot operations are threatened by scrap shortage. One mill is down to less than a week's reserve stockpile.

Philadelphia — Steel scrap shipments to mills are in excess of intake at yards and supply is growing more critical.

Detroit—Industrial scrap is moving almost 100 per cent on government allocation. Electric furnaces take bulk of dealer scrap, none of which is reported on allocation in this locality, although dealers as close as Toledo have received directives on where to ship their material.

Cleveland—Scrap traders forecast an acute shortage next winter. Some material is moving out of this district on allocation; other material is coming in on the same basis. Some yards are handling a record tonnage;

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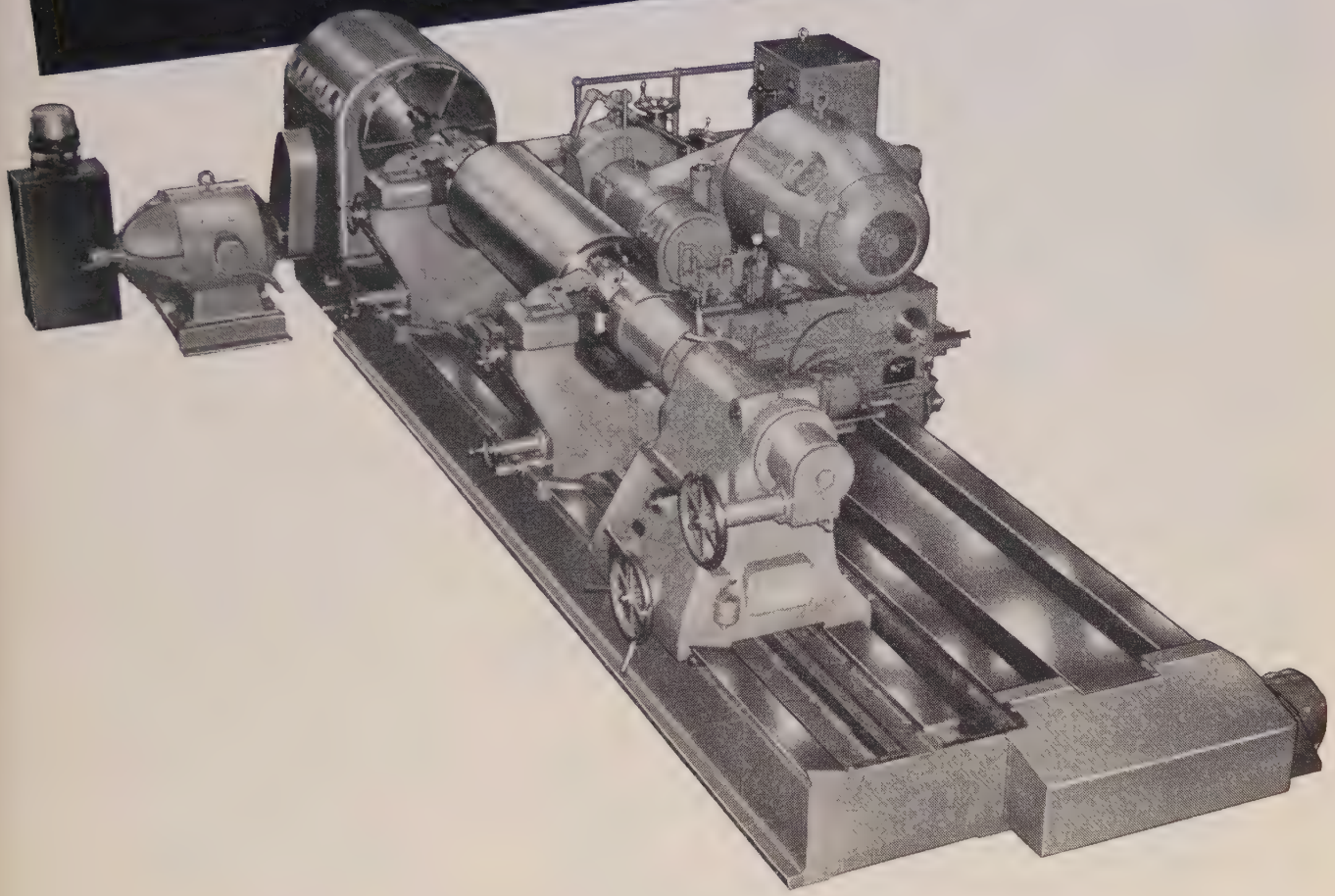

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others are laying off men due to lack of material to process. Foundries, in urgent need of scrap are absorbing large freight charges to obtain supplies from distant points.

Cincinnati—Bulge in iron and steel collections recently was short-lived. Reserves of district mills are low.

Chicago—A dip of 2 points in steelmaking operations in this district last week was attributed to furnace repairs, not scrap shortage. Although mills lose scrap inventory week by week the ingot production rate is not yet sensitive to inadequate receipts of melting material.

St. Louis — Rail scrap shipments continue low and wholly under allocations. Producing plants are starting vacation periods, and some consuming plants have notified dealers to stop shipments for the same reason.

Seattle — Scrap receipts continue satisfactory but they are not in sufficient volume to increase inventories materially. Weather is more favorable for collections and current prices are attracting larger shipments.

Warehouse . . .

Warehouse Prices, Page 151

Cleveland — Warehouse operators expect easing in pressure for steel over the vacation period. Complete plant shutdowns to permit mass vacations will not be as numerous this summer as in recent years, however. Any slackening in demand experienced will be welcomed since it should permit some replenishment of badly depleted stocks. This is especially true since shipments from the mills to the warehouses are expected to pick up noticeably from here on under NPA order M-6. This assures distributors 85 per cent of their carbon steel tonnage receipts in the base period. Outlook for alloy and stainless stocks, however, is unpromising. Stocks of these latter are down to less than 40 per cent of normal, alloy being estimated at 31 per cent and stainless 40 per cent of Oct. 1, 1949 inventories.

Philadelphia—Warehouses are unable to build inventory with carbon products moving out at mill delivery level. Within the 85 per cent warehouse allotment, difficulty is experienced in spreading sizes, loads being unevenly balanced among units.

Pittsburgh — Distributors expect their position this month to improve considerably.

Chicago — Insufficient time has elapsed to appraise benefit expected to accrue from operation of the amended warehouse order M-6 which became effective with shipments from mills.

Ferroalloys . . .

Ferroalloy Prices, Page 151

Washington—Production of silicon alloys increased 14 per cent in the first quarter of 1951 over the fourth quarter of 1950, totaling 242,324 net tons. Shipments of blast furnace silvery pig iron, electric furnace ferrosilicon, and other silicon alloys totaled 224,945 tons in the first quarter compared with 224,553 tons in the final quarter of last year.

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Canada . . .

Toronto, Ont. — Canadian government's plan to stockpile to ensure fair distribution of tubular steel goods to oil companies in the period of short supply goes into effect July 1. An allocation of 13,000 tons tubular steel goods is expected in western Canada about the middle of July.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4500 tons, superstructure, embankment road—north station section, contract E-2, Central Artery, Boston, to American Bridge Co., Pittsburgh.

1100 tons, Army shop buildings, Fort Richardson, Alaska, to Maxwell Steel Co., Fort Worth, Tex.; Valle-Sommers Co., Seattle, general contractor.

500 tons, veterans' hospital buildings, Brockton, Mass., to Chicago Ornamental Iron Co., Chicago; Gust K. Newberg, Chicago, general contractor.

400 tons, ordnance vehicle repair shop, Fort Richardson, Alaska, to Maxwell Steel Co., Fort Worth, Tex.; Valle-Sommers Co., Seattle, general contractor.

345 tons, pumping station facilities, Light, Gas & Water Division, Memphis, Tenn., to Pidgeon-Thomas Iron Co., Memphis; R. P. Farnsworth & Co. Inc., New Orleans, general contractor.

295 tons, hydro-electric project, Penobscot river, Great Northern Paper Co., Millinocket, Me., to Mecquier & Jones Co., and Bancroft & Martin Rolling Mills Co., Portland, Me.; Stone & Webster Engineering Corp., Boston, contractor-engineer.

140 tons, high school, Windsor, Conn., to Haarmann Steel Co., Holyoke, Mass.; A. E. Stevens Co., Springfield, Mass., general contractor.

100 tons, state highway bridge, Dalton-Windsor, Mass., to Phoenix Bridge Co., Phoenixville, Pa.; Thomas R. Rawson, Woburn, Mass., general contractor.

100 tons, Army center, Whittier, Alaska, to Acme Steel Co., Seattle; Haddock Engineers, Seattle, general contractor.

STRUCTURAL STEEL PENDING

2000 tons, crest gates, Rock Island dam, Washington; Consolidated Steel Corp., Los Angeles, low.

680 tons, bridge, relocation, Route 6, Caldwell township, New Jersey.

675 tons, 511-foot, four-span plate girder bridge, Windsor, Conn.; bids June 18, Hartford; also 81 tons steel sheet piling.

600 tons, bridge, Reading Co., Skuylkill river, Reading, Pa.; bids in.

600 tons, bridge, Reading Co., Schepps Dam, near Reading, Pa.

500 tons, testing facilities building, Navy, Johnsville, Pa.; bids June 12.

480 tons, catapult, Navy, Philadelphia; Hughes-Foulkrodt Construction Co., that city, low.

265 tons, grade separations, New Haven-East Haven, Conn.; bids June 18, Hartford.

250 tons, Hanford, Wash., warehouses; L. H. Hoffman, Portland, Oreg., low.

Unstated, Chugach power plant, Alaska; rebids under revised specifications, to Alaska Railroad, Anchorage, Alaska, June 15; low bid $4,177,717 by J. C. Boespflug Construction Co., Seattle, rejected.

Unstated, steel frame radiochemistry building, Hanford, Wash.; Sound Construction & Engineering Co., Seattle, low $3,744,213.

REINFORCING BARS . . .

REINFORCING BARS PLACED

3500 tons, veterans' hospital buildings, Brockton, Mass., to Joseph T. Ryerson & Son Inc., Chicago; Gust K. Newberg, Chicago, general contractor.

1400 tons, pumping station facilities, Light, Gas & Water Division, Memphis, Tenn., to Laclede Steel Co., St. Louis; R. P. Farnsworth & Co. Inc., New Orleans, general contractor.

325 tons, refrigerator warehouse, Fort Rich-

ardson, Alaska, to Soule Steel Co., Portland, Oreg., Haddock Engineers, Seattle, general contractor, $4.1 million.

300 tons, high school, Windsor, Conn., to A. D. Donald Co., Springfield, Mass.; A. E. Stevens Co., Springfield, general contractor.

100 tons or more, warehouse and fabricating plant, Merrill & Usher Co., Worcester, Mass., to Truscon Steel Co., Boston.

REINFORCING BARS PENDING

1080 tons, deck, electrical work and snow melting system, contract C-3, Central Artery, Boston; bids in June 12; superstructure this section contract C-2, takes 15,000 tons of which 795 tons are silicon structural steel.

750 tons, substructure and approaches, contract C-1, Central Artery, Boston; bids in June 12.

190 tons, highway and bridges, New Haven-East Haven, Conn.; bids June 18, Hartford.

170 tons, state bridge, Farmington river, Windsor, Conn.; bids June 18, Hartford.

170 tons, highway and bridge, relocation, Route 6, Caldwell township, New Jersey.

140 tons, bridge piers, abutments and culverts, Fens pond, Charles River reservation, Boston; bids in to Metropolitan District Commission, Parks Division.

PLATES . . .

PLATES PENDING

Unstated, bulk storage and handling facilities, Eielson air field, Alaska, estimated $2.8 million project; bids to U. S. Engineer, June 27.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Atlantic & Danville, one 1600-hp diesel-electric road-switching unit, to American Locomotive-General Electric Companies, Schenectady, N. Y.

Detroit & Toledo Shore Line, two 1500-hp diesel-electric road-switching units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Georgia, two 1200-hp diesel-electric switching units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

St. Louis Southwestern, twelve 1500-hp diesel-electric freight locomotives and four 1200-hp switching units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Tennessee, Alabama & Georgia, three 1500-hp diesel-electric road-switching units to Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Baltimore & Ohio, 1000 fifty-ton box cars, to own shops. Construction expected to start by Apr. 1, 1952.

Burlington Refrigerator Express Co., 200 fifty-ton refrigerator cars, to own shops.

Chicago-Minneapolis & Louisville, one caboose, to Thrall Car Mfg. Co., Chicago.

Erie, two heavy-duty 168-ton depressed center flat cars, to own shops, Dunmore, Pa.

Grand Trunk Western, 125 seventy-ton covered hoppers, to American Car & Foundry Co., New York.

Illinois Central, 100 caboose and 50 pulpwood cars, to own shops.

Missouri-Illinois, 100 seventy-ton hoppers, to Missouri Pacific shops, DeSoto, Mo.

Pittsburgh & West Virginia, five caboose cars, to International Railway Car & Equipment Mfg. Co.

St. Louis Southwestern, 70 fifty-ton box cars, to General American Transportation Corp., Chicago.

St. Louis & San Francisco, 200 seventy-ton gondolas, to Pullman-Standard Car Mfg. Co., Chicago.

Southern Pacific, 4100 fifty-ton box and 900 fifty-ton gondolas; Pullman-Standard Car Mfg. Co. to build 1600 box cars, balance to railroad's own shops.

Union Tank Car Co., 600 fifty-ton tank cars, to own shops.

Wabash, 300 fifty-ton box, to own shops, Decatur, Ill.

RAILROAD CARS PENDING

Tennessee Central, 200 fifty-ton and 150 seventy-ton hoppers.

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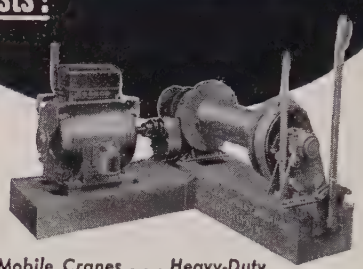

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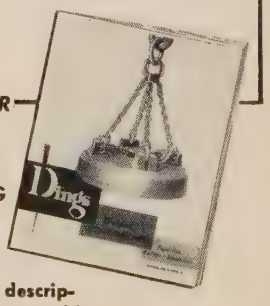

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Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Seidelhuber Steel Expands

Bids for the second phase of the proposed steel rolling mill for Seidelhuber Steel Rolling Mills Corp., to be located at 2745 Eleventh Ave. S.W., Seattle, will be called in about a month. Plans include a scrap yard, melt plant, spur track and craneways. The steel melt building will house equipment already purchased, including an electric furnace. Bids for the third and largest phase, construction of a rolling mill building and installation of equipment, will be invited in about six months following completion of plans. Officers of the company are: Frank V. Seidelhuber Jr., president; William Leckenby, vice president; Frank J. Seidelhuber, vice president; Roy Erickson, treasurer; Wayne C. Booth, secretary.

Enters Electronics Field

Warsaw Products Inc. was organized to succeed the Warsaw Button Co., Warsaw, N. Y. The company manufactures wood products and will diversify its activities to include product and market development, particularly in the electronics industry. Officers of Warsaw Products are: G. A. Godwin, president; J. H. Quick, treasurer; W. G. O'Brien, secretary.

Transformer Plant Enlarged

Marcus Transformer Co. Inc., Hillside, N. J., is adding an annex to its present plant, extending productive space by 50 per cent. The company was founded in 1945 by Alvin Marcus, president.

Luria Moves Branch Office

In order to handle its expanded activities more efficiently, Luria Bros. & Co. Inc. moved its St. Louis office to larger quarters in the Railway Exchange Bldg. Jack Gordon is district manager.

Packard Electric Expanding

New construction and rearrangement of existing facilities are planned by Packard Electric Division, General Motors Corp., Warren, O. The project includes building an addition to Plant 8 and construction of a new employee facility and administration building. The addition to Plant 8, acquired late last year from Federal Machine & Welder Co., will house an expanded wire mill and related operations. Space now occupied by the wire mill in the Dana avenue cable plant will be released for expanded cable-making operations.

Canada Plans Arms Depot

A $3.5 million ordnance depot will be erected at Cobourg, Ont., says the minister of national defense for Canada. Work will get under way in two months.

Moves Los Angeles Office

The Pacific Coast district office of Tinnerman Products Inc., Cleveland, manufacturer of fasteners, was moved to 353½ N. LaBrea Ave., Los Angeles. E. J. Cloutier is district manager.

Appoints Three Distributors

Industrial Chrome Division, Ward Leonard Electric Co., Mount Vernon, N. Y., appointed the following companies as distributors of its Chromaster and Chromasol: S. B. Roby Co., Rochester, N. Y.; Syracuse Supply Co., Syracuse, N. Y.; Logan Hardware & Supply Co., Huntington, W. Va.

Moves to Larger Quarters

Removal of its plant and general offices to 2620 Crane Ave., Detroit, was announced by Bellevue Industrial Furnace Co. Construction is under way to more than double the floor space of buildings that are at the new location. Walter E. Hinz is president.

Foundry Changes Name

Everett Foundry Inc., Everett, Mass., changed its name to Ajax Foundry Inc. and moved its production facilities to larger quarters at 59 Pleasant St., Randolph, Mass. Financial structure and officers remain the same. John T. Watson, formerly associated with Hall-Watson Co., was appointed superintendent of the foundry. Capacity of the new foundry will be three to four times greater than the one in Everett.

Offers Large Subcontracts

Two new buildings, comprising a total floor space of more than 1 million square feet, are being rushed to completion by Pontiac Division, General Motors Corp., Pontiac, Mich. Production of medium caliber cannon will be concentrated in a building scheduled to be completed this fall. The initial contract value of this defense project is $57 million. Another new building, which will be used to make amphibious cargo carriers,

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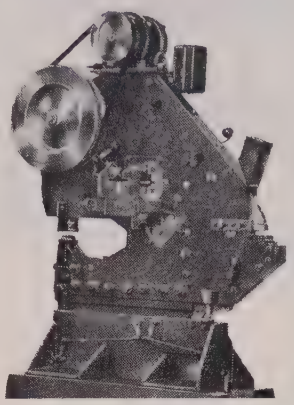

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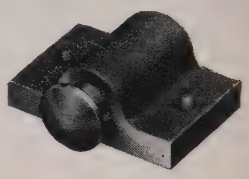

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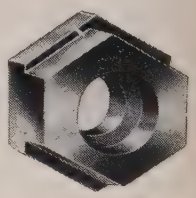

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should be up by early 1952. This defense project has an initial contract value of $45 million and calls for Pontiac to build the automatic transmission, chassis and hull as well as assemble the vehicle. A third defense job, production of Army rockets, will be housed in a refurbished plant building formerly used for storage. For the three projects, about 1300 individual outside suppliers are being asked to furnish Pontiac with parts, assemblies, materials, jigs, fixtures, machines, tools, dies and maintenance items, involving many millions of dollars.

Builds Electric Motor Plant

Westinghouse Electric Corp., Pittsburgh, is erecting a plant in Union City, Ind., which will be geared to produce 75,000 small electric motors a month. Ralph E. Davis will manage the plant. Production is expected to get under way in December.

Buffalo Foundry Organized

Buffalo Foundries Inc., Buffalo, was incorporated with capital of $20,000. Principals are Harlan J. Swift, Raymond W. Conklin and Edwin O. Tilton.

Fletcher Aviation Expands

Fletcher Aviation Corp., Pasadena, Calif., purchased the Rosemead, Calif., airport, for $900,000. The airport will be used by the Pasadena parts and airplane manufacturer for assembly of aircraft, manufacture of airplane parts, and repair of aircraft.

Menasco Mfg. Adds Space

Menasco Mfg. Co., Burbank, Calif., is adding 45,000 sq ft of factory area, the final step in a $6.5 million expansion program. The project will increase production capacity of this aircraft parts manufacturer fivefold.

Defense Orders Increase

Norris-Thermador Corp., Los Angeles, Calif., disclosed a defense backlog of $46 million. Defense sales are 35 per cent of total sales of this maker of automobile wheels, bathtubs, deep-drain cylinders, and stainless steel cooking utensils.

Starts $16 Million Expansion

El Segundo Division, Douglas Aircraft Co. Inc., started a $16 million building program to add 190,000 sq ft of factory area and $8 million of additional machinery. The El Segundo backlog includes contracts for Navy carrier-based airplanes.

Cincinnati Milling Expands

Cincinnati Milling Machine Co. will soon start erection of a third building, with 60,000 square feet of floor space, as part of its $8 million expansion program. Major aim is to enlarge facilities for production of the company's heavier machines. Equipment will include 23 cranes. Work was begun in April on a foundry building. Another plant in Wilmington, O., likely will be completed in two months.

Continental Motors Corp.

Continental Motors Corp., Detroit, is constructing an addition to its manufacturing plant on Algonquin avenue and a new administrative and engineering building. The new building, increasing the Detroit Division's floor space 25 per cent, is necessitated by expanding production of sin-

BIRTHDAY PARTY: Open house in celebration of its fiftieth anniversary at National Automatic Tool Co., Richmond, Ind., finds city officials touring the NATCO plant. Over 7000 visitors inspected the plant during the two-day celebration to learn about manufacture of multiple spindle drilling machines

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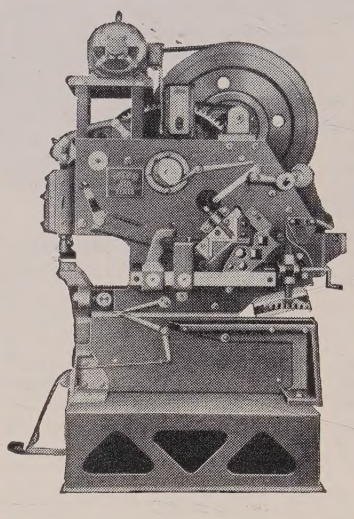

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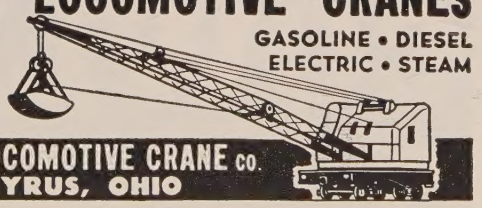

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gle-cylinder air-cooled engines. Continental's orders for small engines are at an all-time high level; unit shipments are running at a rate about 160 per cent greater than a year ago.

Graybar Electric Moves

Graybar Electric Co., New York, opened its new eastern headquarters at Bridge Plaza North and 21st street, Long Island City, N. Y. The company distributes over 100,000 products of more than 200 manufacturers in the fields of electrical supply, communications, electronics and appliances.

Joyce-Cridland Co.

Export activities of Joyce-Cridland Co., Dayton, O., will be handled by Borg-Warner International Corp., Chicago. Joyce-Cridland produces lifting equipment, including hydraulic and manual jacks, garage service lifting equipment, and automobile hoists or lifts.

Celebrates 50th Anniversary

De Laval Steam Turbine Co., Trenton, N. J., is celebrating its 50th anniversary, having been organized in 1901 by Dr. Carl Gustav Patrik De Laval. The company's products now include steam turbines up to 20,000 hp units, compressors providing air in capacities up to 150,000 cubic feet per minute, gear reductions up to 50,000 hp, worm gearing, IMO rotary pumps, centrifugal pumps, etc.

Plans Distillation Plant

Chemical Division, Borden Co., New York, will build an outdoor type of distillation plant near Demopolis, Ala. It will be geared to produce about 1.5 million pounds of formaldehyde and about 2 million pounds of liquid urea resin a month during the first year of operation.

Offers New Electrode Line

Machinery & Welder Corp., St. Louis, was appointed as a distributor for General Electric Co.'s stainless-steel arc welding electrodes. This is an addition to the line of GE a-c welding equipment and mild-steel electrodes that Machinery & Welder has carried for more than 20 years.

Douglas Aircraft Buys Plant

Douglas Aircraft Co. Inc., Santa Monica, Calif., purchased buildings formerly occupied by Southern California Homes Inc., at Bell, Calif., for use as an aircraft subassembly and honeycomb manufacturing plant. The honeycomb material is used to make panels for airplanes and for the production of military truck trailers.

Cambridge Wire Cloth Co.

Cambridge Wire Cloth Co., Cambridge, Md., is expanding the facilities of its Metal Specialties Division. Sales activities will be under the direction of Wallace I. Pink while Edson Leonard will head the engineering department. Everett Creighton remains in charge of production facilities serving the Metal Specialties Division.

Bliss & Laughlin To Expand

Bliss and Laughlin Inc., Buffalo, plans a $414,300 addition for increased production of cold-finished steel bars.

Topflight Tool Builds Plant

A manufacturing plant north of York, Pa., is being constructed by Topflight Tool Co. Inc., that city. The new plant will augment the factory which the company now operates in York. General offices of Topflight Tool Co. and its subsidiary, Topflight Tape Co., will remain at 116 E. Market St. Topflight produces aircraft production tools, hardness testers, riveting and metalworking tools.

Fabricator Leases Plant

Standard Steel Fabricating Co. Inc., Seattle, has taken over temporarily Seidelhuber Iron & Bronze Works Inc.'s former plant building on Dearborn street. Standard's plant at 1640 W. Hanford St. was damaged by fire several weeks ago and every effort is being made by the company to complete a number of structural steel projects on time.

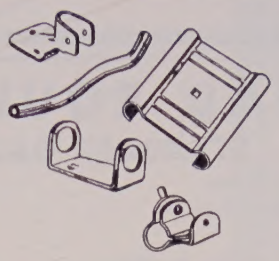
Harris Gets Defense Orders

Harris Hub Bed & Spring Co., Scranton, Pa., received eight defense contracts which will mean high production levels at the plant for the balance of the year at least. The contracts call for a variety of steel and aluminum products.

Boosts Wiremaking Capacity

Expenditure of $200,000 for erection of additions to its main building and $580,000 for machinery and equipment, including extruding machines and general wire production facilities, was authorized by Continental Copper & Steel Industries Inc., New York, for its Hatfield Wire & Cable Division, Hillside, N. J. Expansion is necessary to increase production of Signal Corps wire to 5000 miles per month. The company also approved a new addition at the Hanover Wire Cloth Division, Hanover, Pa.

METAL Fabricating



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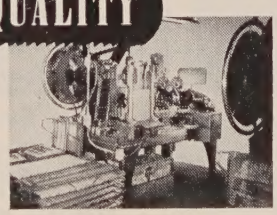

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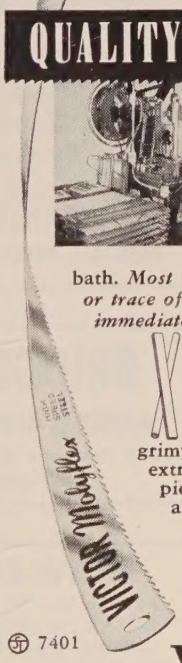

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I—Savage NIBBLER ¼" Cap. Late
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